Social network development of the Stay on Your Feet (SOYF) implementation in the Greater Sudbury Region: A case study.

by

Amanda Paulean Labbé

A thesis submitted in partial fulfillment
of the requirements for the degree of
Master of Arts (MA) in Interdisciplinary Health

The Faculty of Graduate Studies
Laurentian University
Sudbury, Ontario, Canada

THESIS DEFENCE COMMITTEE/COMITÉ DE SOUTENANCE DE THÈSE
Laurentian Université/Université Laurentienne
Faculty of Graduate Studies/Faculté des études supérieures

Title of Thesis Titre de la thèse	Social network development of the Stay on Your Feet (SOYF) implementation in the Greater Sudbury Region: A case study.
Name of Candidate Nom du candidat	Labbé, Amanda
Degree Diplôme	Master of Arts
Department/Program Département/Programme	Interdisciplinary Health
Date of Defence Date de la soutenance	March 17, 2017

APPROVED/APPROUVÉ

Thesis Examiners/Examinateurs de thèse:

Dr. John Lewko
(Supervisor/Directeur de thèse)

Dr. Birgit Pianosi
(Committee member/Membre du comité)

Dr. Bruce Oddson
(Committee member/Membre du comité)

Dr. Richard Volpe
(External Examiner/Examinateur externe)

Approved for the Faculty of Graduate Studies
Approuvé pour la Faculté des études supérieures
Dr. David Lesbarrères
Monsieur David Lesbarrères
Dean, Faculty of Graduate Studies
Doyen, Faculté des études supérieures

ACCESSIBILITY CLAUSE AND PERMISSION TO USE

I, **Amanda Labbé**, hereby grant to Laurentian University and/or its agents the non-exclusive license to archive and make accessible my thesis, dissertation, or project report in whole or in part in all forms of media, now or for the duration of my copyright ownership. I retain all other ownership rights to the copyright of the thesis, dissertation or project report. I also reserve the right to use in future works (such as articles or books) all or part of this thesis, dissertation, or project report. I further agree that permission for copying of this thesis in any manner, in whole or in part, for scholarly purposes may be granted by the professor or professors who supervised my thesis work or, in their absence, by the Head of the Department in which my thesis work was done. It is understood that any copying or publication or use of this thesis or parts thereof for financial gain shall not be allowed without my written permission. It is also understood that this copy is being made available in this form by the authority of the copyright owner solely for the purpose of private study and research and may not be copied or reproduced except as permitted by the copyright laws without written authority from the copyright owner.

Abstract

The aging of the Canadian population is a serious concern. There are calls for innovation, integration, and collaboration among health and social systems to address older adult care needs. The rate of falls among older adults is high and will increase as the older adult population expands and progresses through the later life course. Stay on Your Feet (SOYF), an evidence-based falls prevention initiative, has been implemented in northeastern Ontario. Social Network Analysis (SNA) and semi-structured interviews were used to examine the implementation of SOYF in the Greater Sudbury region. The network was consisted predominantly of informal collaborations among health-related organizations, had low density and high centrality. Furthering community recognition and engagement of older adults were indicated as necessary to achieve sustainability of SOYF. The SOYF implementation network could use more collaboration among health and social organizations.

Keywords: older adult, falls prevention, social network analysis, integration, collaboration

Acknowledgements

I would like to acknowledge my indebtedness and express thanks to my supervisor, Dr. John Lewko, who made this work possible. His modelling of networking, professional relationship building, and facilitation were invaluable and are skills I will carry forward.

The thesis has also benefited from comments and suggestions made by Dr. Bruce Oddson and Dr. Birgit Pianosi as well as Dr. Richard Volpe. I take this opportunity to thank them.

My sincere thanks to my fellow students who exhibited kindness and compassion. An extra special thanks to Michelle Mochan. A friend that was overwhelmingly supportive.

I am profoundly grateful to my family and all their support. Most of all, for all their help and time spent caring for my daughter while I completed this thesis and my course work.

My research would have been impossible without the participation of the interviewees and the permission from their respective organizations. I thank them all as well.

Amanda Paulean Labbé

Table of Contents

List of Tables

List of Figures

List of Appendices

Chapter 1

1 Introduction

1.1 Problem or Opportunity

The aging of the Canadian population is being described as one of our country's most pressing problems and as an opportunity to take strides towards improving social and economic conditions, in part, by altering our health system and policy development (Hicks, 2003; Sinha, 2012). During an address to the Canadian Medical Association (CMA), Federal Health Minister Jane Philpott described the potential for the aging population to overburden Canada's health care system as a myth (personal communication, August 23, 2016). Instead, calling it an opportunity to think big, innovate, and improve care coordination to create lasting positive change (J. Philpott, personal communication, August 23, 2016).

The good news is, Canadians are staying healthier longer, living longer and our aging population is younger than most aging populations in other industrialized countries (Statistics Canada, 2014; Statistics Canada, 2015). As a result, Canada may have a little extra time to prepare. However, Canada's baby boom was larger than most industrialized countries so the proportion of older adults in our population will grow more rapidly between now and 2030 (National Expert Commission [NEC], 2011; Statistics Canada, 2014). The opportunity to think big and innovate to create lasting and positive change in our health system is becoming more urgent as time passes and the year 2030 gets ever closer.

Sinha (2012) highlighted the need to make communities "the foundation of a Seniors Strategy" and provide support to a breadth of health, social, and community resources integral to helping older adults remain active and healthy (p. 22). Health promotion and fall prevention initiatives that incorporate physical activity programming could be bolstered. By focusing on the

building of community capacity through inter and intra-sectoral collaboration the sustainability of health promotion and fall prevention initiatives could be achieved and generate improved health outcomes (MacLellan-Wright et al., 2007; Noya, Clarence, & Craig, 2009). Unless collaborative action occurs to make activities and services available to older adults, fall rates are predicted to remain high and an important public health concern (Public Health Agency of Canada [PHAC], 2014). Integration of care, and making the best use of limited resources and collaboration to implement health promotion programs, is of central concern if we are to alter our health system in response to the aging population (R. Axelsson & S. Axelsson, 2006; Sinha, 2012).

1.2 Integration

Integration is a system-wide process for the coordination of health and social care systems through the formation of inter and intra-sectoral linkages and collaborations that enhance access, efficiency, and quality of services (Heckman et al., 2013). The concept of integration grew out of organizational theory and work done by Lawrence and Borsch (1967). Lawrence and Borsch defined integration as "the quality of the state of collaboration that exists among departments that are required to achieve unity of effort by the demands of the environment" (as cited in R. Axelsson & S. Axelsson, 2006, p.76). There are different ways in which integration can occur.

Vertical integration occurs within primary care settings and among organizations that exist on differing levels of the same hierarchy where directions to integrate activities comes from above (R. Axelsson & S. Axelsson, 2006). Horizontal integration, on the other hand, occurs among differing collaborative organizations that do not share a hierarchy (R. Axelsson & S.

Axelsson, 2006). Integration among organizations, a form of horizontal integration, most often occurs during public health population-based initiatives requiring collaborations with diverse community organizations (R. Axelsson & S. Axelsson, 2006; Valentijn, Schepman, Opheji, & Bruijnzeels, 2013). R. Axelsson & S. Axelsson states, organizational integration or how much services are created, delivered and coordinated, is known to include ample informal collaborative partnerships where most participants are co-operating more or less voluntarily (2006). The integration of care systems for older adults in Canadian provinces has been advancing.

Widespread gains have been made in the delivery of case management services and the identification of objectives to integrate care, at least for the frail elderly (Heckman et al., 2013; MacAdam, 2011). However, more integration is required (Valentijn et al., 2013). Especially, among primary care health, public health, pharmacies, and other health-related organizations along with community-based exercise/physical activity providers (Valentijn et al., 2013). In order to improve the well-being of older adults, health promotion and prevention initiatives will have to be integrated further. Collaboration among organizations that do not share a hierarchy will need to be advanced further in order to continue with integration of services.

1.3 Collaboration

Collaboration is a mechanism of integration and is commonly used in the arena of public health (R. Axelsson & S. Axelsson, 2006). Collaboration allows for the mutually beneficial exchange of knowledge and resources when it occurs within a context of partnership and reciprocity (Ontario Healthy Communities [OHC], n.d.). Without it, existing resources would not be fully tapped into, services could occur in duplication, efficiency may be reduced, and system-wide change might not occur (Altpeter, Schneider, & Whitelaw, 2014). Collaborations and a

monitoring of their effectiveness are equally important.

As a result of collaboration, linkages throughout the community are created which, when nurtured, can result in system-wide and sustainable change (R. Axelsson & S. Axelsson, 2006). Collaborations are aided by having opportunities to meet face-to-face and interact along with having common norms and values (Abbasi, Wigand & Hossain, 2014). Research supports the importance of continued collaboration for implementing and sustaining health promotion and prevention initiatives (Altpeter et al., 2014). Inter-organizational collaboration occurring as a result of public health initiatives, in which multi-disciplinary teams have been strengthened or formed, are most productive and successful when they are sustained over lengthy periods of time (R. Axelsson & S. Axelsson, 2006). Thus, by definition, effective collaborations are required to achieve integration and improve the beneficial impacts of health initiatives in communities.

1.4 Falls Prevention

Health promotion and prevention programs have been shown to improve health outcomes, delay disease onset, and reduce financial strain on the health care system (Fixsen, Naoom, Blase, Friedman, & Wallace, 2005; McClure et al., 2010; Ontario Neurotrauma Foundation [ONF], 2006). However, exercise and falls prevention programming needs to be more readily available in order to help emphasize healthy aging (Sinha, 2012). Successful aspects of falls prevention initiatives and programs have been revealed.

A meta-analysis study of the effectiveness of 40 randomized controlled trials of fall prevention programs that included two or more interventions, such as educational interventions, exercise programs, and environment modification, was conducted (Chang et al., 2004). Chang et al found, that falls for older adults over 60 were best prevented when they started with a multi-

factorial individual risk assessment accompanied by a management program and the incorporation of exercise (2004). Reviews and meta-analyses have also detailed specific strategies, such as exercise training tailored to become increasingly difficult and environmental screening for fall risk factors that provide effective modifications that are integral in preventing falls (Chang et al., 2004; Crandall et al., 2016; Sherrington et al., 2008). Stay on Your Feet (SOYF) is a falls prevention initiative that can encompass all of the above and more.

1.5 Stay On Your Feet (SOYF)

SOYF is a multi-factorial falls prevention initiative that incorporates multiple types of interventions and programs. SOYF is an effective evidenced-based falls prevention initiative created by Queensland Health in Australia. When SOYF was implemented in Australia it reduced the rates of hospitalizations due to falls by 20% (Kempton, Van Beurden, Sladden, Garner, & Beard, 2000). SOYF organizes around five pillars: awareness of falls, reduction of home hazards, furthering of skills development, promotion of partnerships, and creation of policy change (McClure et al., 2010; ONF, 2006). SOYF is meant to create system level change for the prevention of falls among older adults.

SOYF is implemented through community ownership, including older adult leadership roles. SOYF, involves identifying, strengthening, and encouraging collaborations among diverse community organizations such as associations, service groups, social groups and public organizations (Altpeter et al., 2014; MacLellan-Wright et al., 2007). Implementing a community initiative around a particular health aim like falls prevention requires a change in interactions within a community such as collaboration across sectors (Altpeter et al., 2014; Ganz, Alkema & Wu, 2008; Noya et al., 2009). It is important that the change in interactions and collaborations

occurs in a manner that positively impacts all subsets of the older adult demographic.

The SOYF initiative aims to improve falls rate for all older adults. SOYF recognizes that falls prevention efforts will vary according to where subsets of the older adult population are on a spectrum of functional ability as they transition through later life. The Queensland model conceptualizes the spectrum of functioning and well-being for SOYF (see Appendix A). The model encompasses individuals living in the community (low through at risk) to individuals in hospital (increased risk) as well as those receiving in-home support or living in residential aged care homes (ongoing or high risk). Falls prevention initiatives that begin with comprehensive person-focused assessments with subsequent access to multi-factorial evidence-based practices specific to an older adult's particular health status, living arrangement, lived-experience and fall risk level have been shown to be successful (PHAC, 2014). SOYF is an initiative that organizes around the differing health status of groups of older adults to reduce falls.

There is a demonstrated need to bring organizations associated with all points along the health continuum together to effectively meet the health and well-being needs of specific populations, such as older adults (Valentijn et al., 2013). Through collaboration primary care and public health organizations can collectively create care pathways as well as access and opportunity to programming both inside and outside the primary care system (Valentijn et al., 2013). Care pathways form as a result of groups of individuals with similar health status and needs receiving and acquiring health services (Valentijn et al., 2013). Groups of individuals that can be conceptualized using the Queensland Model. With strategic and effective collaboration building, integration of health and social services can occur creating change in the system (ie. enhancing care pathways) to promote access, efficiency and quality of services for all older adults. Inter-organizational collaborations with a common shared goal, such as falls prevention,

scale up to form networks of community organizations.

1.6 Case Study Objectives

The North East Local Health Integration Network (NE LHIN) in Ontario, in collaboration with five public health units, have implemented SOYF. The successful implementation of SOYF necessitates a large integrated network effectively functioning via collaboration. The purpose of this case study was to examine the implementation network of the SOYF falls prevention initiative through the lens of integration. A description of the network and its context in relation to collaboration, communication, and sustainability were the focus. Social Network Analysis (SNA) was used in combination with semi-structured interviews. An exploration of how the activities associated with the implementation could be transformed going forward also occurred.

Chapter 2

2 Systems Science

2.1 Systems Approaches

Systems science seeks to explain systems in which complex behaviour manifests non-linearly from the interaction of elemental parts, producing unpredictable or emergent properties that cannot be explained from an understanding of the parts themselves (Gatrell, 2005; Luke & Stamatakis, 2012; Plesk & Greenhalgh, 2001). Generally, a system contains large numbers of elements, whether objects or people, which leads to interactions across networks and change over time (Gatrell, 2005; Luke & Stamatakis, 2012; Plesk & Greenhalgh, 2001). Although interactions may occur locally, the influential effects can be widespread and non-linear in that small effects can cause large changes (Gatrell, 2005; Plesk & Greenhalgh, 2001). In Luke & Harris (2007):

Systems approaches to public health have been described as "a paradigm or perspective that considers connections among different components, plans for the implications of their interactions, and requires trans-disciplinary thinking as well as active engagement of those who have a stake in the outcome to govern the course of change" (p. 84). Attention has been given to the methods used for studying complex public health systems, the type of systems in which implementation of a public health initiative occur (Luke & Stamatakis, 2012; Maglio, Sepulveda, & Mabry, 2014). Methods, beyond the kind that have been traditionally used.

Traditional public health research methods employed most often are randomized control trial (RCT) and epidemiological risk factor study designs largely conducted at the individual level (Luke & Harris, 2007; Luke & Stamatakis, 2012). In 1982, Joseph McGrath illustrated what he titled the 3-Horned Dilemma outlining the pros and cons of employing various study

designs in public health research (as cited in Luke & Stamatakis, 2012). For example, traditional quasi-experimental designs such as RCT's strive for internal validity at the expense of external validity in order to accurately measure intervention effects (Luke & Stamatakis, 2012). Whereas systems science designs maximize external validity in exchange for precise measurement (Luke & Stamatakis, 2012).

Intervention effects studied in traditional designs generally have chains of causation where allowing a single factor to be manipulated lends to precise measurement (McQueen, 2000). However, this is not the case for complex, multi-disciplinary, multi-organizational, multi-programming interventions inherent to community-wide initiatives targeting a diverse demographic (McQueen, 2000). As a result, systems science designs rely more on relational data (Luke & Harris, 2007). Systems science designs measure and reveal contextual, ecological effects and their impact on behaviour in association with implementation of complex interventions (Luke & Stamatakis, 2012; May, 2013; McQueen, 2000). There are other advantages to using systems science methods for examining community-based initiatives.

Another advantage to using systems science methods over traditional public health research designs can be found in the lack of randomization of study participants (Luke & Stamatakis, 2012). Systems science methods allow for the examination of naturally existing, or organic, social and organizational systems (Luke & Stamatakis, 2012). Systems in which behavioural effects occurring as a result of system influence and interactions among the actors are preserved, supplying researchers with real-world data that is accessible relatively quickly (Luke & Stamatakis, 2012). In contrast, when examining real-world effects of public health initiatives, traditional experimental designs are impeded (Maglio, Sepulveda, & Mabry, 2014). For example, policies cannot be implemented, assessed for results at a later time, and then

replaced by another policy to assess its results by returning in time to before the first policy was enacted (Maglio, Sepulveda, & Mabry, 2014). Systems science approaches are especially revealing when examining complex implementations of health initiatives.

2.2 Implementation

Provan, Veazie, Staten, & Teufel-Shone found "by documenting and tracking relationships among organizations that ostensibly make up a network, communities can enhance their capacity to address current and future needs" (2005, p.604). Perhaps most notable, are how systems science methods have helped community initiatives for the prevention of tobacco use, diabetes outreach, youth civic engagement and community participation (Luke & Stamatakis, 2012). System science has been used by researchers to describe the social networks associated with health and health behaviours for the purposes of improving implementations.

Implementation is best understood as a continuous and interactive material and cognitive-based process, the object of which is to initiate and sustain a multi-dimensional complex intervention into a system (May, 2013). Implementation is less about a final outcome as it is about ongoing or sustained accomplishment (May, 2013). Research has been conducted on the implementation of falls prevention initiatives (Baker, Gottschalk, & Bianco, 2007; Chang et al, 2004). Successful components of falls prevention implementations have been revealed.

Meta-analyses and literature reviews conclude that falls prevention implementations are best when they are community-based and multi-factorial, first, by drawing on multiple professionals and their expertise, and second, by engaging community dwelling older adults (Baker et al., 2007; Chang et al., 2004; Hahn, Van Beurden, Kempton, Sladden, & Garner, 1996). To achieve successful implementation of a falls prevention initiative the reach must

extend into the community, well beyond the context of a clinical care practice (Baker et al., 2007; Chang et al, 2004). Therefore, the multi-dimensional, multi-factorial, community wide and changing nature of implementations lend well to being examined using a systems science method such as Social Network Analysis (SNA).

2.3 Social Network Analysis (SNA)

Social Network Analysis (SNA) is the empirical examination and mapping of social networks using network analysis techniques (Luke & Harris, 2007; Luke & Stamatakis, 2012). The analysis of social networks is a research method, not a theory, subsumed under systems science (Luke & Stamatakis, 2012). The word 'network' is synonymous with collaboration, alliance or group in health care research and health delivery service settings and is used to describe the relationships between actors (or nodes), whether individuals, groups, or organizations (Luke & Stamatakis, 2012). Some of the ways the relationship between nodes can be understood is through examining the amount and types of contact, the communication methods, the information sharing and the forms of collaboration.

It is prudent to pause for a moment to characterize what an inter-organizational network is as it relates to this study. Such a definition will have to be left somewhat flexible as there does not exist a consensus within the network literature (Provan, Fish, & Sydow, 2007). Both broad and narrow definitions have been suggested. Definitions range from a set of nodes with or without an existing relationship to legally binding partnerships to social agreements (Provan et al., 2007). For the purposes of this research the characterization of an inter-organizational network provided by Provan et al will be used (2007). An inter-organizational network is a whole network formally established, made up of 3 or more organizations that are linked via

multilateral ties, governed, and are involved for the purpose of reaching a shared goal (Provan et al., 2007). In this case, the shared goal is the prevention of falls among subsets of older adults represented on the Queensland Model.

The relationships among network members in inter-organizational collaborations are non-hierarchical with little infringement on autonomy, are formal or informal, and exist for a variety of reasons such as information sharing, material and finance resource sharing, service sharing, or social support (Provan et al., 2007). As a result, social network analysis of the SOYF initiative is applicable because it can reveal how context at the inter-organizational network level impacts health delivery processes, in this case SOYF implementation (Kothari et al., 2012; Luke & Harris, 2007). Both the characteristics of the nodes, or organizations, within the network and the structure of the network can be analyzed (Luke & Harris, 2007; Luke & Stamatakis, 2012). Thus, the network connections or collaborations arising from the implementation process can be used to examine the process (Centre for Research in Human Development [CRHD], 2010). The implementation process of SOYF has the potential to greatly impact the older adult population.

Chapter 3

3 Older Adult Demographic

3.1 The Problem of Falls

Inevitably, the aging process leads to a decline in quality of life and health, often from chronic disease and/or injury, and an increased use of the health care system (Canadian Institute for Health Information [CIHI], 2011). Therefore, any event that prematurely tips older adults into a declining state of health is a problem, not only for older adults, but for the health system as well. According to the PHAC (2014), a fall is defined as, "A sudden and unintentional change in position resulting in an individual landing at a lower level such as on an object, the floor, or the ground, with or without injury" (p. 3). Fall events are increasing and are a leading cause of worsening health (PHAC, 2014). Falls are one of the most pressing public and primary health care problems our population, our health system, and the world faces (CIHI, 2011; Crandall et al., 2016).

It is estimated that one in three older adults over the age of 65 fall each year (McClure et al., 2010; PHAC, 2014). The proportion of older adults that fall increases rapidly as they progress through later life (Crandall et al., 2016). Falls are the leading cause of injury-related hospitalizations of older adults and are also the main cause of extended hospital stays, often, on average, nine days longer than stays which occur due to non-fall related admissions (McClure et al., 2010; North East Local Health Integration Network [NE LHIN], 2014; PHAC, 2014). Of the falls that occur, one in four will lead to injuries such as sprains and fractures (90% of which are hip fractures) from which 50% of older adults never fully recover (PHAC, 2014). Falls are the leading cause of premature entry into long-term care facilities and result in 40% of all changes in older adult living arrangements from the community to a long-term care facility (PHAC, 2014).

Having fallen previously, older adults are three times as likely to fall again and half will fall again within a year (PHAC, 2014).

Falls cost the health care system approximately two billion annually (PHAC, 2014; Sinha, 2012). Falls can prematurely tip older adults into the top ten percent portion of the older adult population requiring the most annual health care spending due to declining health and increased health system use (PHAC, 2014; Sinha, 2012). Falls exacerbate the Alternate-Level-of-Care (ALC) crisis. An ALC patient remains admitted in a hospital or complex continuing care facility despite no longer needing acute care services (CIHI, 2012; Sutherland & Crump, 2013), However, they cannot be discharged often because there are no available non-acute care beds or the necessary community supports (CIHI, 2012; Sutherland & Crump, 2013). Ontario has the highest number of ALC patients in the country, the majority of which were initially admitted to hospital due to dementia, stroke, and trauma (CIHI, 2009; Walker, 2011).

Nationally, in 2008/2009, 19.9% of days spent in hospital designated as an ALC patient were a result of being hospitalized due to a fall (Scott, Wagar, & Elliott, 2010). Research also shows that time spent as an ALC patient can lead to reduced functional outcome, reduced mobility, and increased time spent in rehabilitation (Chen et al., 2012). In effect, for some older adults, time spent as an ALC patient after suffering a fall worsens their outcomes. The ALC crisis can be lessened by preventing or delaying fall events or by decreasing the severity of their outcomes. Preventing and reducing the rates of falls could help sustain health and quality of life, reduce fall-related hospitalizations and deter premature increased health system use. To prevent falls through community initiatives an understanding of the heterogeneity among subsets of the older adult population will be of great practical benefit.

3.2 Demographic Heterogeneity

The Ontario Senior's Secretariat (OSS) has signaled the need to understand and anticipate the shifts and changes in the older adult demographic to meet the needs and requirements for older adults to live happier, healthier, and safer lives (2013). Canada's population has exceeded 35 million individuals (Statistics Canada, 2015). Of those 35 million, over 5.7 million individuals, or almost one in six (16.1%), were older adults over the age of 65 (Statistics Canada, 2015). The number of older adults in Canada is set to nearly double by 2030, the year in which the youngest of the Baby Boomers (individuals born between 1946 and 1965), will reach 65 years old (OSS, 2013; Statistics Canada, 2015).

Of the G7 countries, Canada has a more youthful aging population. The proportion of older adults over 65 years of age (16.1%) is second lowest, slightly more than the United States (15%) (Statistics Canada, 2015). While our older adult population is proportionally more youthful, Canada's baby boom is one of the largest that occurred in an industrialized country. This means, the proportion of older adults over 65 years old will grow more rapidly than other G7 countries between now and 2030, when the growth is predicted to peak (NEC, 2011; Statistics Canada, 2014). The population is aging more quickly in Ontario, Quebec, British Columbia and the Atlantic province compared to the Prairie Provinces and Territories (Statistics Canada, 2015). The population overall is living longer.

A significant contributor to the rise in the aging population is the fact that Canadian life expectancy has risen by nearly 25 years since 1921 (Statistics Canada; 2011). On average, life expectancy is now 81.7 years (Statistics Canada, 2011). In addition, the gap between the average

age reached by men and women has been shrinking between 1970 (men - 69 years, women - 76 years) and 2009 (men - 79 years, women - 83 years) (Statistics Canada, 2014). Increased life expectancy rates are considered to be a result of medical advances, improved public health care, and higher educational levels (PHAC, 2011). Although improvements in life expectancy are welcomed, it is not the best measure for assessing quality of health status. Rather, functional status (activities of daily living) and multi-morbidity (having three or more chronic diseases) give a better picture (PHAC, 2011). Together, this data indicates that older adults are experiencing an increase in health-adjusted life expectancy at a faster rate than life expectancy by staying healthy longer (PHAC, 2011). Increasingly, the health status of younger older adults is mirroring the health status of individuals under the age of 65 (PHAC, 2011).

However, the older adult population is not a homogeneous group and is usually separated demographically into three age categories including 65-74, 75-84, and 85 years old and over (Statistics Canada, 2011). The 65-74 year old age category is currently the fastest growing age category and has the greatest proportion of older adults (Statistics Canada, 2014). By 2030, individuals over the age of 65 will account for almost one in four (22-23%) of our entire population and total approximately nine to ten million (Statistics Canada, 2015). As the 65-74 year olds continue to age it is projected that there will be over 4.2 million individuals over the age of 80 by 2063 (Statistics Canada, 2011). Progressively through the age categories, there are more females than males such that by 80 years of age the ratio is expected to be 61 males per 100 females (Statistics Canada, 2012). Not surprisingly, the majority of centenarians, individuals over the age of 100, in Canada are women (Statistics Canada, 2011). As of 2011, there were 5,825 centenarians and it is estimated that by 2030 there will be over 17,000 centenarians (Statistics Canada, 2015). The older adult population is aging in conjunction with other changing

demographics.

3.3 Coinciding Demographics

The aging of the population is co-occurring with two new and important population records: a declining youth population and a recent baby boom (Statistics Canada, 2015). Due to 40 years of a total below-replacement-level fertility rate, for the first time in Canada's history, the number of individuals over 65 years old is greater than the number of individuals less than 14 years old (Statistics Canada, 2015; Statistics Canada, 2014). Health care use rises as older adults age, develop more chronic disease conditions, and become frailer (Canadian Institute for Health Research [CIHR], 2012). For example, older adults use health care resources, such as doctors, nurses, pharmacists, physiotherapists, social workers, counsellors, specialists, and emergency departments three times as often when they have three or more chronic conditions (CIHR, 2012). By 2024 it is predicted the percentage of individuals over 65 years old will surpass 20% while the percentage of individuals 0-14 years old will be nearer to 16% (Statistics Canada, 2015). A small labour force coexisting with a large older adult population has some concerned.

The number of working-age people per older adult will decline. By 2056 (the time period in which the majority proportion of older adults will be approximately 80 years old and be in need of more health services) there may only be 2.2 working-age people per older adult (Statistics Canada, 2008). In comparison, during the 1970's there were seven working-age people for every individual over the age of 65 (Statistics Canada, 2014). Along with a shrinking workforce comes a shrinking tax base and the ability to afford care for a large older adult population when there will be a much smaller population base to contribute taxes and fund the

system (Beach, 2008). Some have speculated that the aging population should be considered a demographic imperative as it could pose serious financial concerns to the existing health care system (Hahn et al., 1996; PHAC, 2014; Sinha, 2012). For example, in Ontario, the most ill portion of the older adult population, the top 10%, accounted for 60% of annual spending, as compared to the healthiest 50% portion of the older adult population which accounted for only 6% of annual spending (OSS, 2013; Sinha, 2012).

In light of a shrinking labour force and increased health care costs, the ability to provide appropriate care to the growing older adult population may be compromised by another more current demographic reality. Between 2006 and 2011 another baby boom occurred leading to a growth rate that has not been seen since the years 1956-1961 (Statistics Canada, 2011). During those years, the population of children aged four years and under rose by 11% (Statistics Canada, 2011). As a result, Statistics Canada declared that, "Canada has become a nation increasingly made up of older adults and young infants" (Statistics Canada, 2011). This is concerning since older adults and infants are the two cohorts that rely most heavily on health care services. Together the initial 0-14 youth population decrease and the more recent baby boom have prompted speculation of our ability to adequately provide appropriate health care in the future for the burgeoning older adult demographic.

3.4 Geographies and Health

Rural areas make up 95% of Canada's land mass and constitute all areas outside of urban centres including remote, northern, and Indigenous communities (Ministerial Advisory Council on Rural Health [MACRH], 2002). Rural areas face unique challenges in delivering health services, including public health initiatives like falls prevention. Throughout rural areas there is a

discrepancy between available health care professionals and health services and the health care needs of individuals, especially for the disabled and older adults (Haldimand-Norfolk Health Unit [HNHU], 2007; MACRH, 2002). Many health care services are not accessible to rural residents without significant travel, such as diagnostic services, emergency and acute care, health promotion, and non-acute services, many of which are needed by an aging population (HNHU, 2007; MACRH, 2002). The difficulties of providing prevention initiatives is compounded further by the population make up of rural areas.

Rural areas in Saskatchewan, Ontario, British Columbia, and Nova Scotia have higher amounts of older adults than other provinces (Statistics Canada, 2010). Rural areas, in general, have a higher proportion of older adults than urban areas, especially if the rural area is not adjacent to a metropolitan area (Statistics Canada, 2010). For example, in the NE LHIN catchment area where many communities are not adjacent to metropolitan areas, there are a proportionally higher number of older adults (NE LHIN, 2008). The rural older adult population is due in part to aging in place, as opposed to migration (Statistics Canada, 2010). Rural areas have more older older adults than older adult populations in urban areas (Statistics Canada, 2010). There are other demographic realities that make providing health opportunities to older adults more difficult in rural areas.

Rural areas also have a higher proportion of children under 15 years old, making rural areas subject to the demographic reality of having proportionally larger amounts of young children and older adults simultaneously (Statistics Canada, 2010). Another reason for the higher proportion of older adults in rural areas, as compared to younger populations, are the high rates of youth out-migration usually for work and/or education purposes (Statistics Canada, 2010). In addition, certain sub-populations have grown at higher rates than other sub-populations in rural

areas (Ontario Trillium Foundation [OTF], 2011). For example, the numbers of Indigenous older adults and elders has increased at a higher proportion than other sub-populations (OTF, 2011). The health statistics also vary according to rural and urban geographies.

The health of older adults in rural areas tends to be poorer than the health of older adults in urban areas (MACRH, 2002). In fact, the farther away from an urban centre residents live the poorer the health of the residents (MACRH, 2002). There is quite a bit of variation as to the specific health issues that Canadians living in rural areas experience based on their particular location (MACRH, 2002). Overall, rural Canadians have higher rates of chronic diseases such as diabetes, arthritis and high blood pressure as well as obesity and smoking all in combination with lower levels of physical activity (MACRH, 2002). In addition, the Indigenous population, including First Nations, Inuit, and Métis have higher rates and earlier onsets of chronic diseases (OTF, 2011). Not surprisingly, the greater population of older adults in the NE LHIN area is also coupled with an approximately 40% higher rate of falls among older adults (NE LHIN, 2012; NE LHIN, 2014). As a result of the uniqueness of rural and northern areas, providing care and addressing widespread and complex health issues, such as falls, through collaboration can be more difficult.

3.5 Activity and Programming

Physical activity as a whole is increasing among the older adult population (Craig, Russell, Cameron & Bauman, 2004). In fact, on an age-standardized basis, the percentage of older adult Canadians categorized as moderately active or active increased from 53% to 55% between 2005 and 2011 (Statistics Canada, 2014). However, rates of physical activity are not increasing equally across the entire older adult cohort. Older adults with higher education levels

report the greatest amount of physical activity whereas older adults with lower levels of income report lower amounts of physical activity (Statistics Canada, 2014). There are barriers to participating in physical activity.

Older adults report winter weather, safety, lack of programming availability, physical health, cost, and lack of parking as barriers to participating in physical activity (Craig et al., 2004; Statistics Canada, 2014). In rural areas, older adults face additional barriers to being able to engage in physical activity such as lack of transportation, lack of instructors, and lack of sidewalks (Craig et al., 2004; Statistics Canada, 2014). In Dr. Sinha's report (2012), he remarks "any comprehensive strategy for improving quality of life for seniors must address issues beyond health care - it needs to encompass issues like housing, transportation, and safety" (p. 17). This includes improving access to physical activity programming.

Improving access to programming and activities associated with falls prevention was also a key finding in Dr. Sinha's report (2012). One method to achieve this goal would be to bring services and programming into the spaces and places that older adults inhabit, such as Older Adult Centres (OAC's) (Sinha, 2012). To do so, an understanding of the activities and, therefore, places in which older adults frequent, keeping in mind the heterogeneity of the older adult demographic would be necessary. According to the Canadian Community Health Survey (CCHS), Canadians over the age of 65 spent their time, weekly and monthly, engaged in the following types of activities (2015) (see Table 1).

Weekly	Monthly
Family	*Educational or other activities*
church	*Service Club*
Sports with other people	*Neighbourhood*
Hobbies, bingo, other games	*Volunteer work*

Table 1. Weekly and monthly activities self-reported by older adults. Data from the Canadian Community Health Survey (CCHS, 2015).

Through research completed by the Older Adult Centre's Association of Ontario (OACAO) we know that the types of activities older adults engaged in, and therefore the places they frequented, differed based on their age, health status, and income level (2010). The results of the OACAO survey of older adults allows for a comparison of older adults attending OAC's versus those not attending OAC's. Most older adults that attended OAC's, reported they were in the middle (70%) to low income brackets (20%) (OACAO, 2010). In fact, nearly three quarters of OAC members were female (OACAO, 2008). Of the female members, 29% were in a lower income bracket as compared to only 17% of male members (OACAO, 2010). Half of (50%) of

OAC members were married and more than one-third were widowed (34.3%) (OACAO, 2008). The average age of OAC members was 65-74 years (39%), followed closely by 75-84 years (38%) (OACAO, 2008). Fewer than ten percent of OAC members' accessed community support services and less than 5 percent obtained any type of in-home services (OACAO, 2010). When OAC members reached roughly the age of 75 a visible downgrading of their health tended to occur (OACAO, 2010). Once a members' independence was compromised their participation in OAC's dropped significantly.

Older adults surveyed that did not attend OAC's tended to have higher income levels, were younger older adults, were married, and still employed part-time or full-time (OACAO, 2010). Non-members of OAC's tended to be active members of churches (28.9%), community recreational facilities (15.8%), fitness clubs (especially Boomers) (13.6%), and private clubs (11.7%) (OACAO, 2010). Forty-seven percent of non-members also reported volunteering at least once a week. Together, CCHS and the OACAO's studies highlighted the heterogeneity of older adults with regard to their social, physical, familial, and cultural preferences, at least on the basis of their attendance or non-attendance of OAC's. They also served to identify a range of contexts and places where older adults could be approached and engaged in various prevention efforts, including falls prevention.

3.6 Falls and Frailty

Despite the trend towards increased health for younger older adults, health status eventually declines and rates of disease increase, especially chronic disease, leading to reduced quality of life (Statistics Canada, 2014). Almost 75% of older adults over the age of 65 suffered from chronic health conditions, many of which suffered with two or more conditions that are

life-limiting (Carstairs, 2010; CMA, 2013). In addition, up to 25% of older adults aged 65-79 had four or more chronic conditions (Carstairs, 2010; CMA, 2013). The most common chronic conditions among older adults were arthritis, diabetes, high blood pressure, heart disease, and dementia (Statistics Canada, 2014; CIHI, 2011). Typically, older adults over 65 years of age experienced increased functional declines in their health so that, on average, by age 77 they incurred worsening disabilities characterized by multiple activity limitations (Statistics Canada, 2014). A number of chronic conditions that impact mobility, gait, and balance contribute to frailty and place an older adult at greater risk of falling (PHAC, 2014).

The progression of health decline among older adults can be examined through the use of the Clinical Frailty Scale (Nowak & Hubbard, 2009). Frailty, although there is no agreed upon definition, is a significant clinical indicator that can be predictive of likelihood of injury from a fall, the need for admission to community dwellings, and even death (Faculty of Medicine [FOM], 2009). The 9-Point Clinical Frailty Scale ranks individual health from Very Fit (1), which captures the younger older adults, through to Terminally Ill (9) (FOM, 2009). Falls and frailty often co-occurred and were predictive of each other (Nowak & Hubbard, 2009). Increasing frailty, although occurring at a later age for some older adult populations, is a normal aging process throughout later life.

Demographic projections indicate our aging population is progressing through the points of the Clinical Frailty Scale and will continue to do so in greater numbers over the next 50 years. Assessing older adults for fall risk as they age can help target conditions that can be altered through falls prevention initiatives to reduce the risk of a fall (Nowak & Hubbard, 2009). In addition, reducing rates of falls among older adults could help reduce the number of older adults that are prematurely pushed to higher categories on the Clinical Frailty Scale due to injuries from

a fall (Nowak & Hubbard, 2009). This calls for a clear understanding of the diversity of the older adult demographic, including their health status, in combination with the differences among pre-cursors to falls, such as frailty, as well as where and when falls occur.

Health status, or level of frailty, also impacted an older adults living arrangements. Along with the growing older adult population, changes in family situations and living arrangements have occurred which are important in helping to understand where falls occur (Statistics Canada, 2014). According to the Statistics Canada 2011 census, a full 92% of older adults lived in the community in private residences (Statistics Canada, 2014). Among the 65-74 age category, most older adults lived in a private household with a spouse, a common-law partner, and/or their children and grandchildren (NEC, 2011). There has also been an increasing number of older adults residing in private households that reported living as a couple (NEC, 2011; Statistics Canada, 2014). As older adults continue to choose to age in place and stay in private residences, it is not surprising that 50% of falls occurred in the home (PHAC, 2014). Rates of older adults living in other types of dwellings have also been changing.

The number of older adults that resided in collective dwellings, such as older adult residences or health care related facilities, across all older adult age categories has been declining since 1981 (Statistics Canada, 2014). However, as older adults become increasingly frail the proportion of older adults in higher age categories living in collective dwellings increased (Statistics Canada, 2014). For example, older adults over the age of 85 accounted for 31.1% of older adults living in collective dwellings (Statistics Canada, 2011). Still, overall only eight percent of older adults lived in collective dwellings, seven out of ten of them being women (Statistics Canada, 2014). Falls in collective dwellings are the next most prominent environment (17%), next to private residences (50%), in which falls occurred (PHAC, 2014). The following

figure highlights the most common places where falls occurred (see Figure 1).

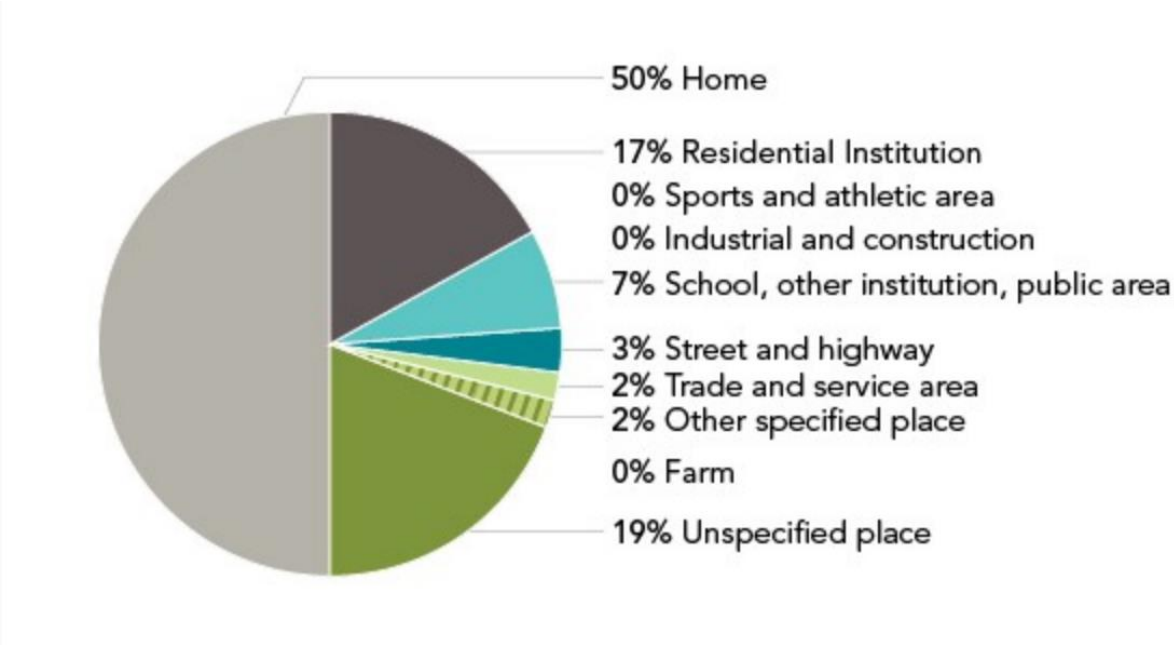


Figure 1. Fall-related hospitalizations, by place of occurrence of fall, age 65+, Canada, pooled across all fiscal years (PHAC, 2014)

Where and when falls occur, or during which type of activity, varies along the Frailty Index. Frail older adults, whether at home or in collective dwellings, fell indoors more often while transitioning, walking, or not moving (Kelsey, Procter-Gray, Hannan, & Li, 2012; Li, Keegan, Sternfeld, Sidney, & Quesenberry, 2006). Overall though, more falls occurred outdoors than indoors, especially among more physically active or less frail older adults who tended to fall during walking or higher intensity physical activity (Li et al., 2006). The activity associated with falls most often was walking and occurred as a result of environmental factors such as the sidewalk, curb, street, garden, patio, porch, or deck (Kelsey et al., 2012; Li et al., 2006; PHAC, 2014). In addition, walking on a surface other than snow and ice accounted for 45% of falls whereas walking on snow and ice accounted for 16% of falls (PHAC, 2014). Outdoor falls from

walking also tended to result in greater physical injury, such as fractures and sprains (Kelsey et al., 2012).

The older adult demographic in Canada is quickly approaching the peak in which a critical mass of older adults will have reached the age of 65, an age in which health care services begin to be utilized more and more often. Combine this scenario with a shrinking workforce, a recent mini-baby boom, increased caregiving demands, and the eventual need for long-term care due to increased life expectancy it is not difficult to foresee the problems. As the Canadian older adult demographic evolves while transitioning throughout the aging process from healthier to more frail, the system and its profile of health initiatives and programming will have to evolve in tandem.

The OSS has recognized that the full spectrum of older adults, from healthy to vulnerable older adults, need to be provided with opportunities to stay active and healthy (2013). To do so, the diversity of the older adult demographic and its activities needs to be taken into account. For example, such things as geography, living arrangements, health status/frailty, social activity and physical activity along with the differences in when and where falls occur. The demands of providing access and opportunity for falls prevention programming based on the heterogeneity of the older adult population need to be met.

However, success cannot be achieved without strategically aligning the environment in terms of the network of collaborating community organizations and falls programming, existing or potential, with the factors contributing to demographic heterogeneity. The SOYF initiative allows flexibility to address the realities of the older adult demographic by incorporating existing resources and services within a community and by adding new programming and opportunities

as required (ONF, 2006). Each community adopting SOYF tailors its own complement of interventions based on their context such as availability of organizations, resources, and knowledge of their older adult demographic (ONF, 2006). Therefore, revealing the local network context and building from it is at the core of implementing SOYF to achieve success in preventing falls rates among all older adults.

Chapter 4

4 Methods

4.1 Local Network Context

This case study focused on collaborations among the network of organizations throughout the Greater Sudbury area that were affiliated with the implementation of SOYF. It is important to note that, although consistently used network data measures were conducted, data from them will only provide useful information regarding the network when the particular network and its context are also considered (Provan et al., 2007). In addition, organizations within a network will be influenced by not only their position within the network but also by the greater structure of the whole network (Rowley, Greve, Rao, Baum, & Shipilov, 2005). The case study aimed to provide network and interview data that could then be used to discuss the evolution of the SOYF network in its particular context. One such context was the geographical nature of the area in which the network existed.

Greater Sudbury is centrally located in northeastern Ontario, is the regional capital, and has a population of approximately 160,000 (Regional Business Centre [RBC], 2013). Geographically, Greater Sudbury is the second-largest municipality in Canada with a mix of urban and rural areas (RBC, 2013). Greater Sudbury is a multicultural community with significant Francophone and urban Indigenous populations (RBC, 2013). The Municipality of Greater Sudbury is a service hub for approximately 550,000 northeastern Ontario residents hosting government, not-for-profit, and for-profit organizations and businesses that provide support and delivery of varied health and community services (RBC, 2013). The Greater Sudbury Public Health Unit is one of the five Public Health Units that teamed up with the NE LHIN to implement SOYF approximately one year ago.

Any organization, whether provincial or federal government, not-for-profit, for-profit or other had the potential to be included in the group or network of interest as long as they were indicated as being involved or contributing to the implementation of SOYF. The Model of Stakeholder Participation was used to determine the organization types present in the network (University of Toronto, 2015). This model has been used to help identify the types of partners involved in health initiatives, and how engaged partners are in the initiative in order to help make decisions on how to keep partners engaged regardless of their level of participation (University of Toronto, 2015). Types of organizations included government, health-related (primary, public, and allied), non-health related, community/grassroots, or private sector (University of Toronto, 2015). Identifying organization types enabled determination of the diversity of the organizations present in the SOYF network and could help pinpoint which uninvolved organizations could be engaged going forward. Research shows that community-based health initiatives such as SOYF were most successful when traditional and non-traditional cross-sector alliances were present in a network making an assessment of organizations involved, or not, important for continuing the implementation (Altpeter et al., 2014).

4.2 Data Collection

SNA and interview data were collected from participants (n=12) who acted as "informants as agents of an organization of interest" (Marsden, 1990). A common practice when collecting network data seeking to understand inter-organizational relations (Marsden, 1990). Recruitment required first contacting an organization representatives' supervisor in order to receive consent from the organization to interview the employee most pertinent to their involvement in SOYF. Then, the organization representatives provided consent. A script was used to request participation. The script included an introduction to the project purpose, a brief

description of the type of data requested, confirmation of confidentiality and consent to participate. Altogether, contacting and receiving written consent from supervisors took approximately six hours (half hour per participant) to complete.

Each of the 12 organization representatives provided SNA data and answered accompanying interview questions. Data was collected either face-to-face (n=10) or over the telephone (n=2). Each of the 12 organization representatives that participated completed data collection in one session that lasted approximately 40 to 60 minutes. Face-to-face meetings averaged approximately 30 minutes per interviewee and involved travel time from 15 to 30 minutes each. The same data was gathered in the same order, including SNA data followed by interviews that were recorded and then transcribed. Organization representatives were free to end participation at any time for any purpose. No organizational representative ended an interview.

There were 43 organization representatives identified as members of the SOYF network representing the following types of organizations: government (2), health-related (34), non-health (3), community/grassroots (2), and private business (2). In addition, the interview questions yielded data relevant to the engagement of older adults, and insights on the achievement of sustainability for SOYF.

The case study methods for acquiring participants were dictated by procedures normally used during SNA studies. A snowball sampling procedure was used. When using a snowball sampling method, the majority of participants are generated during data collection (Heckathorn, 2011). Snowball sampling is suitable for situations where the network members are not easily defined and need to be discovered, as was the case with the Greater Sudbury SOYF network (Heckathorn, 2011).

To begin to identify participants using the snowball sampling method, key informants/participants/name-generators, were contacted first (Marsden, 1990). The two key informant organization representatives initially contacted were chosen due to their high level of involvement in the SOYF implementation and Greater Sudbury older adult initiatives. The key informants generated names of up to 10 other organizational representatives they collaborated with for, in this case, the purposes of their work related to SOYF. Some organization representatives mentioned by the two key informants were the same. An initial working list of 12 potential participants identified by the two key informants was generated.

The 12 organization representatives divulged by the key informants were then contacted for potential participation with consent from their supervisors. Each new organization representative that participated also shared up to ten other organization representatives they collaborated with, some of which were the same organization representatives mentioned by other interviewees. The previously unidentified organization representatives were then contacted for participation. This process of contacting potential new participants continued after each interview. Gathering participants and data collection continued until organizational representatives were identified at least twice by different interviewees, the number of new organizations being listed diminished, and three phone calls to previously un-interviewed participants were not answered. The process took five to six weeks to complete.

Each organization representative was asked to reveal up to ten organizations/organization representatives important to their work related to SOYF in an unaided recall method, meaning they did not have a pre-supplied list of names of organizations/participants to choose from (Hanneman, Robert & Riddle, 2005). The SNA survey (self-reported data) had been previously used to network analyze a public health initiative in northeastern Ontario (CRHD, 2010). The

initial two organization representatives were then asked the same series of questions about each of the ten organizations/organization representatives they divulged. As such, each participant had a dual role in that each were a name-generator and name interpreter by sharing data related to their network relationships with other organizations (Marsden, 1990).

Limiting the number of organization representatives identified to ten helped define the boundary of the network. Defining the boundary of a network is used to cap the number of nodes included in a network study (Marsden, 1990). Technically, in a snowball sampling method the boundary is not limited as names can continue to be generated, depending on the size of the network. Placing a limit on the number of names that are generated by participants is common practice to keep the network data collected manageable (Marsden, 1990). Finding the boundary of a network using a snowball method is relatively easy since most actors/nodes, or organization representatives, have limited network connections of strength, or importance, and many of an actors/nodes connections are generally reciprocated (Hanneman et al., 2005; Marsden, 1990).

4.3 SNA Survey

The SNA survey collected data related to distance between organizations/organization representatives, or nodes, (same department, same organization, affiliated organization, outside organization), the primary mode of communication among nodes (email, telephone, conference calls, group meetings, individual face-to-face meetings, other specified) , the frequency of contact (daily, weekly, bi-weekly, monthly, less than monthly), and if sufficient perceived communication between nodes existed (strongly disagree, disagree, sometimes disagree sometimes agree, agree, strongly agree) (CRHD, 2010) (see Appendix B). Data related to collaboration was also collected including length of time known (< 6 moths, 6 months to 1 year,

1-5 years, 5-10 years, > 10 years), understanding of another's position (little understanding about what this person does, some understanding what this person does, understand exactly what this person does), and level of collaboration (do not work together, share information only, work together informally to achieve common goals, work together as a formal team e.g. MOU, work together as a formal team e.g. share staff and resources) (CRHD, 2010).

4.4 SNA Data Analysis

The composition of the network and an understanding of the relationships among organization representatives with respect to their SOYF work were determined from the 12 participant/organization representatives. Network analysis was performed using Ucinet 6.531 (Borgatti, Everett, & Freeman, 2002). A database was created by first inputting data into a matrix with rows representing organizations/organization representatives and columns representing the same organizations/organization representatives with either a 0 (absence) or 1 (presence) being inserted into cells indicating the absence or presence of a relationship between any two organizations. Analysis of data determined the network measurements of **density, betweenness centrality and in-degree centrality.** Data was used to demonstrate the presence of informal and formal partnerships. Sociograms, or network maps, were produced using NetDraw (Borgatti et al., 2002).

Network data for organization representatives that did not respond to a request to participate were included even though reciprocation of collaboration was not confirmed through their participation. In network data collection, survey questions ask about the relationship between the interviewee and another member of the network, in this case, another organization representative whom the interviewee lists as a network connection (Provan et al., 2005). If data

regarding the relationship between two network members is not verified by reciprocation while interviewing the second member of the network connection, the data can still assist in gaining an understanding of the types of interactions occurring among organizations in the network (Provan et al., 2005).

Density was calculated using frequency of contact data. The most common and long-standing measurement used in SNA is density (Marsden, 1990). Density is simply the number of all the ties between pairs of actors [participants such as organizations], or dyads, that are present divided by the total number of pairs possible (Hanneman et al., 2005; Marsden, 1990). Another way to think of density in networks is to consider each tie between a pair of actors as binary, it either exists or it doesn't (Hanneman et al., 2005). This dyadic structure is the smallest social structure that actors can engage in (Hanneman et al., 2005). The denser, or more connected, a network is the more actors within a network are in contact and interact (Hanneman et al., 2005; Marsden, 1990). Density indicates the overall connectedness, coordination, and flow of information throughout the organizational network and allows for discussion of how much density is beneficial to function effectively without constraining organizations in terms of productivity relative to time spent collaborating (Provan et al., 2007). A denser network is not necessarily beneficial (Provan et al., 2007). Density is scored between zero and one and was expressed as a percentage for this studies results (Corteville & Sun, 2009).

Centrality is measured by quantifying and assigning a value to the number of direct connections between an actor and other network members (Abbasi et al., 2014). The degree of centrality, or connectivity, indicates how extensively an actor is connected to other actors in the network and can help explain how a node/actor is embedded in the network (Hanneman et al., 2005; Luke & Harris, 2007). High centrality may mean an actor (or organization representative)

has an important, powerful or influential role in the network with more access to opportunities and less constraints, at least among their direct connections (Hanneman et al., 2005; Provan et al., 2007).

In inter-organizational networks, networks are highly centralized if a small number of organizations are directly linked to many other organizations or decentralized if the links are not concentrated around a few organizations, but rather dispersed throughout the network (Provan et al., 2007). Organizations which have higher centrality may have an advantaged position, at least locally among their immediate direct connections, since having more ties means there may be more options to satisfy the needs of an organization in terms of resource availability, for example, to reduce their dependence on any one other organization (Hanneman et al., 2005). Measuring centrality can pinpoint which organizations are acting and being depended upon as intermediaries between other organizations (Corteville & Sun, 2009; Hanneman et al., 2005; Provan et al., 2007). Centrality can be measured in multiple ways, for this case study betweenness centrality and in-degree centrality were measured.

Betweenness centrality was analyzed using frequency of contact data. Betweenness centrality is calculated by determining how many times an actor/node has the shortest path or connection to two other nodes (Hanneman et al., 2005). Betweenness centrality essentially informs which organizations are acting as gatekeepers for the sharing of items, such as information, or which may play the role of dealmaker or communicator between organizations (Hanneman et al., 2005; Provan et al., 2007). The higher the betweenness centrality of any node in a network the more likely that node, or organization representative, affects communication and information flow.

In-degree centrality was calculated using level of collaboration data. Degree centrality is simply how many links, ties, or connections a particular node has (Hanneman et al., 2005). In-degree centrality measures how many ties or connections are in-coming to a particular node. Having high in-degree centrality is suggestive of popularity and an indication of how much other network members may want to connect with them. Network members with high in-degree centrality may be excellent sources of information. In contrast, out-degree centrality is a measure of ties or links that a node directs to others. Having high out-degree centrality suggests the ability to be influential and gregarious through interacting outwards with a higher number of other nodes in the networks. Network members with high out-degree may be pivotal in the spread of information throughout a network.

4.5 Interview Data

The semi-structured interview contained open-ended questions that provided information regarding the SOYF initiative. Questions centered around: the organization representatives role, their duration and frequency SOYF tasks, which sub-population/s of older adults their organization reached out to, the specific activities their organization engaged in to support falls prevention, whether any other organizations besides the initial ten asked for were helpful to their work on SOYF, and the single action they thought was required to improve the implementation of SOYF going forward (see Appendix C).

4.6 Interview Data Analysis

Interview question data was transcribed. One category of data concerning the sustainability of the SOYF initiative was content analyzed for frequency of themes, or combinations of words or sentences conveying an idea (Boyatzis, 1998). Transcripts were

initially read through to list the different kinds of information discussed. On the second reading of transcripts the types of information/themes were coded, confirmed, and labelled as major or minor based on frequency of occurrence. A second reader independently reviewed the data on sustainability. Differences in opinion were resolved to consensus. Data was anonymized and discussed and presented in results in aggregated form to reduce social risk.

Employing SNA techniques to measure the implementation process of SOYF via the characteristics of networks discussed above could help illuminate how both individual actors, or organization representatives, and the network structures are impacting implementation. SNA can also help describe the contact and collaboration occurring in the SOYF network. Interview questions paired with SNA survey questions can help reveal the perceptions of roles and activities engaged in by organization representatives within the SOYF network. As well, interviews can offer insights on how to improve the implementation of SOYF going forward from multiple viewpoints throughout the organizational network.

Chapter 5

5 Results

The 12 organization representatives that provided SNA data on the SOYF network, as well as interview data, were from the following types of organizations (categorized according to the Model of Stakeholder's Participation (University of Toronto, 2015):

- Government
  - *Municipality (1)*
  - *Provincial Government (1)*
- Health-Related
  - *Public Health Unit (2)*
  - *Local SOYF Coalition (1)*
  - *Primary Care Providers (2 hospital-based, 2 community-based)*
- Non-Health
  - *Universities (2)*
- Community/Grassroots
  - *Older Adult Centre (1)*
- Private Sector
  - *Private Business (2)*

SOYF had been operating for a year within the municipality at the time of data collection. The SNA survey (n=12) resulted in the identification of a network of 43 organization representatives. The size of the network is first described, including number and types of organizations, density, as well as the nodes/actors that had the highest betweenness centrality and in-degree centrality. Next, images have been prepared to demonstrate the extent of both the informal and formal partnerships reported as occurring by the twelve interviewees. In the SNA maps/figures that follow, each node/organization, is represented as a square, colour-coded by type of organization. Each number represents an organization representative that was divulged as a network contact by the twelve participants. The interview data follows the SNA data.

5.1 SNA Data

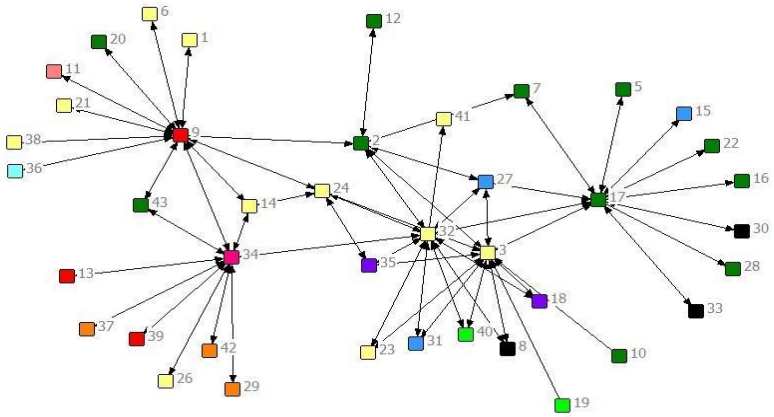
There were a total of 43 individuals representing 20 organizations (see Table 2). The SOYF network was primarily composed of health-related organizations with little representation from non-health-related, community/grassroots, government, and private sector. Some organizations/organization types were listed as network members by participants more than once since they listed various organization representatives within a single organization.

Table 2

Total types and amount of organizations

Type of Organization	Organization (Representatives)
Government	Municipality (1) Provincial (1)
Health-Related	NE LHIN (3) Primary Care (13) PHU (11) Community Care (3) Long-Term Care (1) Non-Profit (3)
Non-Health	University (3)
Community/ Grassroots	Older Adult Club (2)
Private Sector	Private Business (2)
Total - Organizations	11
Total - Representatives	(34)

Table 2. Total types and amount of organizations (organization representatives in parentheses). NE LHIN stands for North East Local Health Integration Network. PHU stands for Public Health Unit.



Legend

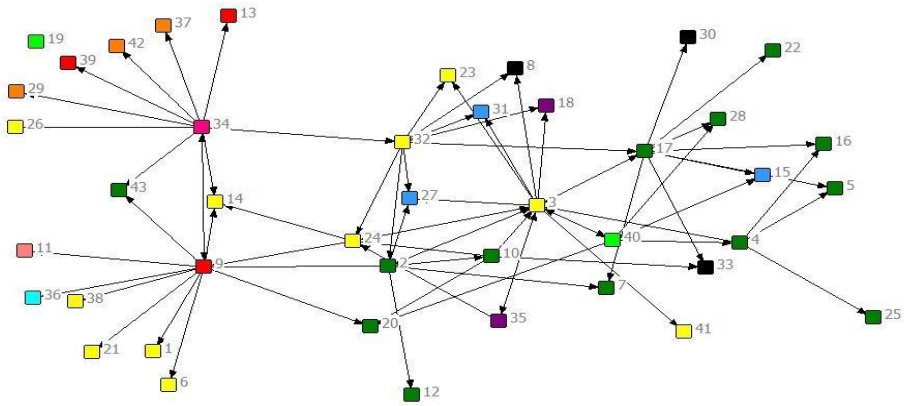
Government	**Health-Related**
NE LHIN - Red	PHU - Yellow
Municipality - Pink	Primary Care - Green
Provincial GVT - Light Red	Long-Term Care - Light Blue
Private Sector	Community Care - Black
Private Business - Light Green	Non-Profit - Blue
Non-Health	**Community/Grassroots**
Academic - Orange	Older Adult Club - Purple

Figure 2. SOYF Inter-Organizational Network. The above map shows the 43 organization representatives identified as members of the SOYF network and their connections to other organization representatives. The organization representatives are colour-coded with respect to the kind of organization they represent.

Figure 2 shows the left side of the map is largely made up of NE LHIN, PHU, and academic organizations with some connections to primary care and long-term care. The right side of the map is largely made up of primary care organizations with some long-term care and community care organizations. Organization 19 and 34, red and pink respectively, on the left represent the NE LHIN and the municipality. They connect mostly to organization representatives from the NE LHIN, PHU, and academia. Number 3, 14, 24 and 32, all yellow, are PHU representatives. They connect organizations from the left side and the right side of the map suggesting their role is important as intermediaries between organization types from government, health-related and academia as well as service-delivery organizations such as long-term care, community care, and primary care.

Density

The density of the network, measured using frequency of contact, was 11.3%. The maximum potential density is 100%, a situation where every actor is tied to every other actor. Overall, the network organizations were not well connected to each other.



Legend

Government
NE LHIN - Red
Municipality - Pink
Provincial GVT - Light Red

Private Sector
Private Business - Light Green

Non-Health
Academic - Orange

Health-Related
PHU - Yellow
Primary Care - Green
Long-Term Care - Light Blue
Community Care - Black
Non-Profit - Blue

Community/Grassroots
Older Adult Club - Purple

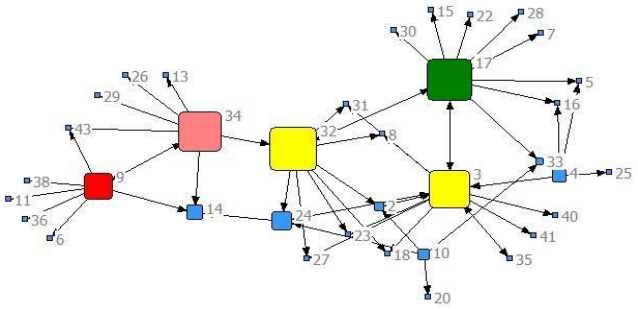
Figure 3. Density of SOYF Inter-Organizational Network. The above map shows the 43 organization representatives identified as members of the SOYF network and the frequency of contact among them. The organization representatives are colour-coded with respect to the kind of organization they represent.

The left side of the density map (see Figure 3) shows that organization representative 9 (red) and 34 (pink), NE LHIN and municipality respectively, appeared to have small direct networks with which they more frequently communicated suggesting greater connection,

coordination, and flow of information among them. The right side of the figure contained a more diverse selection of organizations including primary care, non-profit, long-term care, private business, and older adult clubs. The density, and therefore amount of communication, among organization representatives on the right side of the figure was less than what occurred among organization representatives on the left side of the figure. Examining the figure from the middle where the PHU organization representatives 3, 14, 24, and 32 (all yellow) are displayed and rightwards, the figure shows the network is less dense but includes a greater variety of types of organizations being communicated with.

Centrality – Betweenness

Betweenness centrality was measured using frequency of contact. The SOYF network was highly centralized. Four organization representatives had the shortest paths or the greatest number of direct connections to all other organization representatives. Of the 12 organizations represented due to participation, betweenness centrality was highest for 3, 32 (yellow) representing the Greater Sudbury PHU and 17 (green) a Primary Care organization as well as 34 (pink) the municipality (see Figure 4). These organization representatives acted as important connectors to other network members and therefore had prestige, acted as gatekeepers, and influenced information flow within the network.



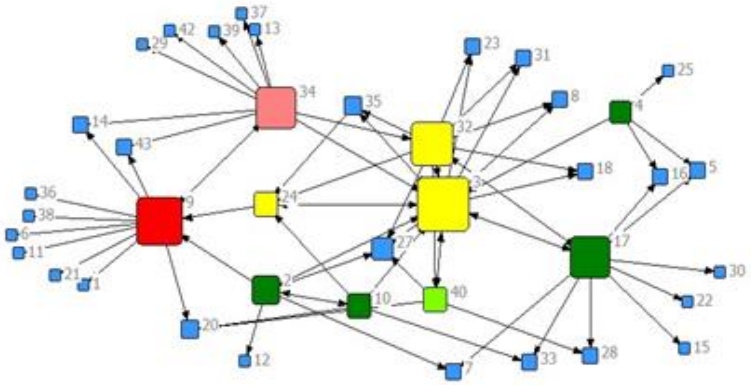
Legend
NE LHIN - Red
Municipality - Pink
PHU - Yellow
Primary Care - Green
Primary Care - Green
Other Organizations - Blue

Figure 4 - Betweenness Centrality in the SOYF Inter-Organizational Network. The organization representatives with the highest betweenness centrality are colour-coded with respect to the type of organization they represent. NE LHIN stands for North East Local Health Integration Network. PHU stands for Public Health Unit.

Centrality – Degree

Degree centrality was calculated using level of collaboration data (see Figure 5). Collaboration types from working together informally to working together formally with a Memorandum of Understanding (MOU) were included. The two PHU organization representatives 3 and 32 (yellow) as well as 17 (green) a Primary Care Organization (providing programming based out of the hospital) had the highest in-degree centrality and, therefore, the greatest number of links in-coming from other network members. Out-degree centrality and, therefore the greatest number of out-going connections with other network members, was highest for PHU organization representatives 3 and 32 (yellow), the NE LHIN representative 9 (red), and

17 (green) a Primary Care Organization as well as 34 (pink) a municipal representative.



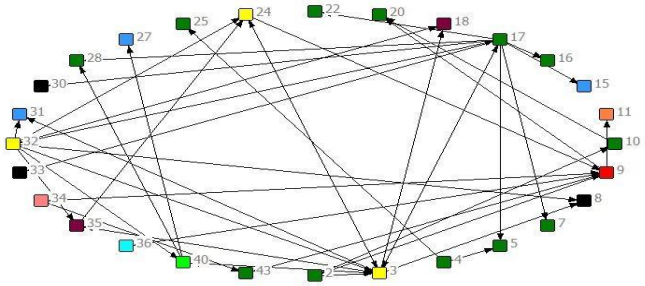
Legend
NE LHIN - Red
Municipality - Pink
Non-Profit - Blue
PHU - Yellow
Primary Care - Green
Private Business - Light Green

Figure 5. In-degree and Out-degree centrality in SOYF network. Arrows represent the direction, in or out from an organization representative. The organization representatives are colour-coded with respect to the kind of organization they represent. NE LHIN stands for North East Local Health Integration Network. PHU stands for Public Health Unit.

Informal Collaborations

Informal partnerships/collaborations were predominant in the SOYF network (see Figure 6). As is typical with health networks involving community-based organizations, most collaborations were informal involving sharing of information only or working together informally to achieve common goals. Most informal collaborations occurred between organizations that were similar in that they were health-related, hospital or community-based

primary care, as well as long-term care, community care, and public health. Informal collaborations between health-related organizations, mainly PHU, and non-health related organizations also occurred with non-health-related organizations including for-profit (light



Legend

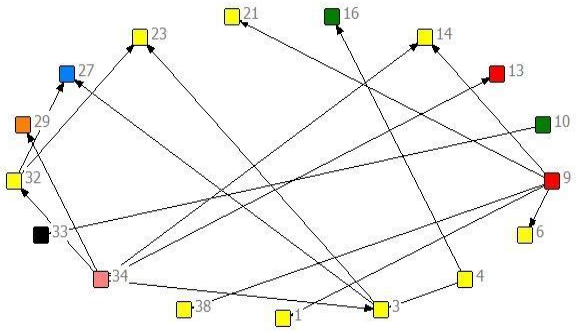
Government	**Health-Related**
NE LHIN - Red	PHU - Yellow
Municipality - Pink	Primary Care - Green
Private Sector	Long-Term Care - Light Blue
Private Business - Light Green	Community Care - Black
Non-Health	**Community/Grassroots**
Academic - Orange	Older Adult Club - Purple

green), academic (orange), and older adult clubs (purple).

Figure 6. Informal collaborations among SOYF network members. The organization representatives are colour-coded with respect to the kind of organization they represent. NE LHIN stands for North East Local Health Integration Network. PHU stands for Public Health Unit.

Formal Collaborations

Formal collaborations were reported less often than informal (see Figure 7). Formal collaborations included partnerships where reports indicated that pairs of actors worked together as formal teams with a MOU in place or wok together as a formal team and share staff and resources. Formal collaborations were reported as occurring among health-related organizations (PHU, NE LHIN, primary care, long-term care, community care) as well as government



(municipality), and non-health-related organizations (academia).

Legend
Government
NE LHIN - Red
Municipality - Pink
Non-Health
Academic - Orange

Health-Related
PHU - Yellow
Primary Care - Green
Long-Term Care - Light Blue
Community Care - Black

Figure 7. Formal Collaborations among SOYF network members. The organization representatives are colour-coded with respect to the kind of organization they represent. NE LHIN stands for North East Local Health Integration Network. PHU stands for Public Health Unit.

5.2 Interview Data

The organizational representatives were asked to respond to several questions, including the following: "One of the reasons Stay on Your Feet has been successful is because different people can be involved on different levels. What would you check off about your level of involvement in Stay on Your Feet over last 6 months?" showed that organizations/organization representatives that spent the most dedicated work time helping to implement the SOYF

initiative were government-related (NE LHIN) and health-related (public health and primary care) (see

Table 3).

Table 3

Level of Involvement by Organization Type

Type of Organization	Level of Involvement
Private Business	1-2 times
Municipality, Older Adult Club/Organization, Private Business (other)	3-5 times
NE LHIN, PHU, Primary Care	6+ times

Table 3. Level of involvement by organization types. NE LHIN stands for North East Local Health Integration Network. PHU stands for Public Health Unit.

In response to**,** "Describe the population in the community that your organization reaches out to for your work on Stay on Your Feet" community-dwelling older adults were the sub-population of older adults most reached out to by organizations (see Table 4).

Table 4

Population groups engaged by organizations in SOYF network

Population Being Reached Out To	Number of Organizations
Community-Dwelling Older Adults	8
Older Adults in Long-Term Care	2
Caregivers	3
Older Adults > 65 Admitted to Hospital	1
Older Adults > 75 Emergency Room Visit	1
Older Adults Post Fall	1

Table 4. Population groups engaged by organizations in SOYF network.

Interview question, "Are there any other individuals that help you with what you are doing for Stay on Your Feet that haven't been mentioned so far?" aimed to identify organizations involved with SOYF that were not listed as an interviewee's top ten most important network connections. Community/Grassroots organizations were mentioned more often in response to this question than being listed among the top 10 individuals asked for initially in the SNA survey questions (see Table 5).

Table 5

Types of organizations reported as additional collaborators not included as top 10 network members

Type of Organization	Organization (Total)
Government	City of Greater Sudbury (1)
Health-Related	Primary Care Providers (5) Health Administration (1) Community Care Providers (2) Non-Profit (2)
Non-Health	None
Community/ Grassroots	Older Adult Organizations (1) Community Action Networks (1) Older Adult Volunteer (1) Religious Institutions (2)
Private Sector	None

Table 5. Types of organizations reported as additional collaborators not included as top 10 network members.

In looking to the future, organizational representatives were asked, "What is the single most important thing the SOYF initiative can do in the next two years to improve the implementation of Stay On Your Feet?" Three themes were identified: community recognition, older adult engagement, and older adult ownership (see Table 6). Interviewees were asked to discuss a single action/item the SOYF initiative could do to improve implementation, however many interviewees mentioned more than one. In this situation, the interviewee was asked to choose which single thing they thought was most important from their list. Additional themes that emerged related to ease of access/transportation, policy and collaboration, and programming.

Table 6

Themes identified as important to sustainability of SOYF.

Theme	% of Participants
Community Recognition	50%
Older Adult Engagement	33%
Older Adult Ownership	16%

Table 6. Themes identified as important to sustainability of SOYF.

Community Recognition

One-half of the organization representatives remarked that there was not enough recognition in the community of the SOYF initiative. By recognition they meant an awareness of the existence of SOYF as a falls prevention initiative across the entire community, including older adults and organizations. It was remarked that SOYF was not well known and that many in the community, especially older adults, were not previously aware of SOYF's existence when it was mentioned to them. It was suggested that more non-media related publicity and networking opportunities, especially for organizations and professionals not already involved, should occur to try and spread knowledge of SOYF through organizations and on to older adults. Organization representatives said this could potentially be accomplished by designating persons to actively go out and engage older adults and other individuals present in the places/spaces that older adults frequent, such as churches and Older Adult Centres/Clubs. While health professionals, including public health professionals, were vital components of SOYF the initiative should strive to evolve in a bottom-up fashion out of the community more so than top-down from the professionals.

Older Adult Engagement

A small number (n=3) of the organization representatives commented that the process of engaging older adults should evolve from passive marketing, such as posters and brochures, to more active marketing, such as face-to-face contacts. However, technology, including social media, should be utilized more. They felt that passive marketing through posters and brochures made available in public spaces were no longer very effective. For example, caregivers for older adults and older adults themselves are becoming more tech savvy so using technology and social media should be relied on more. In addition, strategies on how to keep older adults engaged over time was also mentioned. Some of the recommendations included strategically planning SOYF programming and educational events to coincide or be integrated into social events for older adults and making a point of going to where the older adults already frequent for social purposes, such as Older Adult Centres.

Older Adult Ownership

Some interviewees (n=2) saw the key to sustainability of SOYF being older adult ownership of the SOYF initiative. Involving older adults as champions of the SOYF initiative by fostering peer-to-peer interactions should be an important component of SOYF. For programming subsumed under the SOYF initiative where older adults are trained to deliver the programming, special attention should be paid to the empowerment and mentorship of new older adult trainers to retain them. Barriers to recruitment of new older adult trainers could also be reduced to engage older adults. A more flexible arrangement in which older adult trainers are not so heavily relied upon and the extent of the commitment required is reduced would be advantageous. The realities of life as an older adult sometimes meant they were unable to meet all commitments even when they would have liked to.

Interviewees (n=2) remarked that older adult ownership of SOYF is perhaps more important than ever due to two current realities of the older adult experience. First, there is increased fear regarding personal security due to identity theft and the number of illegal scams directed at older adults. Second, many older adults dislike receiving information from an individual perceived as a 'person of authority' and would prefer to learn from their peers and loved ones. As a result, older adults are becoming more and more reliant on their peer network, caregivers, and trusted sources such as churches and clubs for information on programming and other opportunities. Engaging and empowering older adults in the spaces/places they choose to inhabit such as older adult centres/clubs/groups/churches and providing opportunities for them to network among themselves to promote SOYF and related activities would be ideal.

Chapter 6

6 Discussion

6.1 SOYF Network

The heterogeneous older adult demographic growth is concerning from the perspective of health and well-being, In particular, the rate of falls is increasing as the population ages causing injury, hospitalization, and even death among older adults. A community level response is needed to address falls and the multitude of factors that increase the risk of falls. Stay on Your Feet (SOYF) is a multi-factorial falls prevention umbrella initiative implemented through community ownership by involving those that have a stake in the outcome. SOYF requires inter-organizational collaboration and could be a vehicle from which further integration of health and social systems can be accomplished.

This case study examined the implementation of SOYF by the North East Local Health Integration Network (NE LHIN) in Greater Sudbury approximately one year post implementation. A system science method called Social Network Analysis (SNA) was chosen based on its ability to help improve health initiatives (Luke & Stamatakis, 2012). By, in part, providing real-time contextual data on the types of organizations in the SOYF network, their collaborations and activities. Semi-structured interviews were also employed to further elucidate the organizations, collaborations, activities, and efforts concerning the achievement of sustainability. All data gathering grew out of first establishing the organizational makeup of the SOYF network.

The SOYF initiative consists of five pillars. Two pillars of SOYF are falls awareness and hazard reduction. A third pillar is partnerships. The network, and its growth of collaborating

partners, can be conceptualized through these three pillars. First, by determining who needs to be made aware of falls and hazard reduction. All older adults on the health continuum need to be made aware of falls and hazard reduction and take part in programming. Older adults in the community, in hospital, receiving in-home support and those living in collective dwellings need awareness and access to programming (see Appendix A). Second, by determining which organizations could be collaborated with to help make older adults aware and deliver programming.

For successful integration, the assortment of health and social organizations collaborating in a network are a primary concern. The implementation of SOYF was approximately one year prior to this study. SOYF allows each community to work with their particular complement of organizations and resources. In the past, when SOYF was piloted in communities in Ontario, each implementation began with detailing existing collaborations and available resources through an environmental scan (ONF, 2006). The organizations making up the network and their affiliation and representation of older adults across the health spectrum in Greater Sudbury are discussed below.

The SOYF network was largely made up of health-related organizations (34 of 43) (see Table 1). The majority representing primary care and public health (24 of 34). The types of organizations were categorized using the Model of Stakeholder's Participation (University of Toronto, 2015). As per Figure 2, PHU organization representatives had network connections with a few primary care organizations, For the most part, the primary care organizations were well connected amongst themselves with only a few having direct connections to the NE LHIN and the PHU's. Instead, the PHU's appeared to be intermediaries between the NE LHIN and other organizations classified as primary care. Given that any PHU has limited resources and a

finite amount of time, consideration may be given to designating representatives from the various types of health-related organizations to actively network among their perspective organizations to develop further collaborations. Thereby, extending the networking, and potential primary care collaborations, by creating subnetworks in order to grow the SOYF initiative.

Health-related organizations were the most prominent organizations in the SOYF network. This suggests that older adults may have become aware of or involved in SOYF after accessing the primary care health system. In reference to the Queensland Model (see Appendix A), awareness may have been limited mostly to sub groups at higher risk of a fall including those that had been hospitalized for a fall or other health issue. Research shows that falls prevention initiatives are most successful when they begin with individual assessments (Chang et al., 2004; PHAC, 2014). Individual assessments for falls risk are completed by qualified health professionals often after a fall event or other health complication. The process of conducting falls risk assessments and engaging older adults to make them aware of falls initiatives at the primary care health level is a more established process than at the community level. However, to engage as many older adults as possible older adults from all points of the health continuum should be represented by organizations in the SOYF network.

For the older adults living in the community, which make up the majority of older adults, engagement would be best if it occurred outside of and before they access the health system due to a fall or health complication. This is especially critical when considering older adult reluctance to report falls or near falls after they have occurred (Schonnop, Yang, & Feldman, 2013). Of the older adults that self-reported falls, only 72% accessed the health system, either the emergency department or clinic, with some taking up to 48 hours to do so (CCHS, 2003). To

engage older adults living in the community, especially those that have not yet accessed the health system to prompt a falls risk assessment, the SOYF network could be expanded.

The SOYF network had very little non-health, community/grassroots, and for-profit organization representation (see Table 1). They were government (2), non-health-related (1), community/grassroots (2) and private (1). When organization representatives were asked if there were any additional organizations important to their work on SOYF five organizations were mentioned. They represented community/grassroots type organizations, including OAC's, community action networks, and religious organizations. Overall though, community/grassroots organizations for older adults were notably absent. For example, only two OAC's had been reported as primary network members of importance and two other OAC's as additionally important network members, four out of a possible total of 29 OAC's.

A 2015 report on Older Adult Centres (OAC's) indicated that there were 29 OAC's in the municipality of Greater Sudbury that older adults attended (Labbe, Lewko, Volpe, Salmoni, & Colantonio, 2015). A little less than half of the OAC's reported not having exercise classes and nearly three quarters reported having no falls prevention programming (Labbe et al., 2015). All OAC's had stated they would like to have more programming (Labbe et al., 2015). A need for falls assessments for all individuals over the age of 65 and for those assessments to occur in the community more often has been identified (Regional Geriatric Program of Eastern Ontario [RGPEO], 2015). Considering the desire of OAC's to have more programming and the number of OAC's that reported not having exercise classes or fall prevention programming the SOYF network could include more OAC's. Interviewees reported that having falls programming coincide with existing social programming was recommended by older adults they spoke with. OAC's could be utilized further to engage older adults and provide programming including falls

risk assessments as well as exercise and physical activity.

Even if the SOYF initiative recruited more OAC's, this would not be enough to actively engage the full spectrum of older adults. When studied, OAC's had been attended by older adults generally between 65 and 74 years of age (Labbe et al., 2015). Most did not have in-home support nor did they access community support services if they attended OAC's (Labbe et al., 2015). This suggests these older adults have less of a chance of becoming aware of SOYF through health care organizations and it would be more necessary to reach them through community organizations. Also, older adults surveyed that did not attend OAC's tended to have higher income levels, were younger older adults, were married, and still employed part-time or full-time (OACAO, 2010). Non-members of OAC's tended to be active members of churches (28.9%), community recreational facilities (15.8%), fitness clubs (especially Boomers) (13.6%), and private clubs (11.7%) (OACAO, 2010). Forty-seven percent of non-members also reported volunteering at least once a week. Growing the SOYF network to include more community and religious organizations as well as places of employment, and gym facilities would be paramount to reaching the older adult population that does not attend OAC's.

Starting at age 75 or after a serious health concern, fewer older adults attend OAC's (Labbe et al., 2015). A downgrade in health and worsening of frailty are also the major causes of older adults moving into collective dwellings (FOM, 2009). Rates of falls are second highest in community dwellings (PHAC, 2014). There has likely been some engagement of older adults receiving in-home support or living in residential aged care homes through the existing SOYF network. Although, the representation of long-term care facilities was minimal. Likely, these older adults would have already been assessed for falls having accessed the primary care health system. The reported SOYF network included community care providers (3) and a long-term

care provider (1). There are already falls prevention and exercise programming occurring in collective dwellings. However, SOYF could seek out collaborations with more collective dwellings to enhance the reach of SOYF and bring existing programs under the SOYF umbrella. Both long-term and community care providers could be more present in the SOYF network in an effort to engage both the younger older adults and the older, older adults.

The CCHS collected data from older adults 65 years old and up (CCHS, 2015). This data does not help differentiate the differences in activity and places/spaces where older, older adults and younger adults frequent. It does, however, provide a good base point for understanding where and how older adults in general spend the majority of their time. It can provide the SOYF initiative with important indicators of what organizations it should seek out through further networking and collaboration. The CCHS data stated the weekly and monthly activities self-reported by older adults (2015) (see Table 1). As seen in Figure 2 in results, the distribution of organization types represented in the network did not align with the spaces in which the preferred activities of older adults occurred. For example, there was limited representation of religious organizations, legions, hobbies/interest clubs, third-age educational groups, private clubs, organizations in which older adults volunteer or older adult community organizations such as clubs/centres or sports/recreational facilities.

Table 1. Weekly and monthly activities self-reported by older adults. Data from the Canadian Community Health Survey (CCHS, 2015).

Weekly	Monthly
Family	*Educational or other activities*
church	*Service Club*
Sports with other people	*Neighbourhood*
Hobbies, bingo, other games	*Volunteer work*

Expanding community/grassroots organizations within the SOYF network may also help increase older adult ownership of SOYF. Older adults with lead roles could be specifically

tasked with engaging organizations in the community where they know other older adults congregate. Keeping in mind, older adults prefer to be engaged [by other older adults] in places they socialize in which there is an existing level of trust and safety experienced (Belza et al., 2004). However, interviewees remarked that engagement of older adults and ownership of the initiative by older adults and the general public did not seem sufficient. Despite, 8 out of 12 interviewees stating they specifically reached out to older adults living in the community. Three themes were discussed as important to the implementation; community recognition, older adult engagement and older adult ownership. One interviewee discussed the barriers for older adults that take on a lead role in the SOYF initiative. Barriers that are constructed due to the lived experiences of older adults. To improve the rates at which older adults engage with SOYF in lead roles the barriers to their participation will need to be explored further.

There are other angles from which the SOYF network could be expanded. For example, where falls occur. Knowing that 50% of falls occur in the home, it is especially important to improve awareness and engagement among community dwelling older adults as discussed above (PHAC, 2014). According to the Statistics Canada 2011 census, a full 92% of older adults lived in the community in private residences (Statistics Canada, 2014). Among the 65-74 age category, most older adults lived in a private household with a spouse, a common-law partner, and/or their children and grandchildren (NEC, 2011). There has also been an increasing number of older adults residing in private households that reported living as a couple (NEC, 2011; Statistics Canada, 2014). To extend the reach to older adults living in private residences that may not have been engaged in SOYF through a community organization awareness could be expanded into workplaces to engage working or volunteering older adults as well as their spouses, partners or children. Also, SOYF could collaborate to reach into schools to engage their grandchildren.

Community school boards and major community employers could be approached for potential collaboration and involvement in the SOYF network.

Where else and when falls occur could also be advantageous to building the SOYF network. For the younger, healthier and more active older adults the falls occur mostly outdoors and during walking or higher intensity exercise (Li et al., 2006). In addition, when injuries happen they are usually more severe among the younger healthier older adults (Li et al., 2006). Outdoor fall events have been associated with public spaces infrastructure such as sidewalks, curbs as well as around the home (PHAC, 2014). Knowing this, the SOYF initiative may want to specifically engage community sports groups such as walking and hiking groups as well as parks and recreation organizations, provincial and municipal. In addition, thought could be given to engaging home inspection associations, hardware/building supply stores, medical supply stores, insurance companies, realtor groups and fire departments to help address falls awareness in general and hazard reduction specifically.

Barriers to participation is another angle which can help flush out organizations that may potentially collaborate within the SOYF initiative to help improve access. Access in terms of making older adults aware of falls and hazard reductions as well as ability to attend programming. There is a demonstrated need for more physical activity opportunities for all older adults. However, some older adults face barriers to participating such as low income levels, winter weather, lack of parking and physical health (Craig et al., 2004; Statistics Canada, 2014). Cost barriers refer to the cost of participating and travelling to programming as well as upgrades to the home. In the Greater Sudbury SOYF network the municipality was a key collaborator. In rural areas, there are further barriers including lack of transportation and lack of instructors (Craig et al., 2004; Statistics Canada, 2014). Policy changes could be one avenue to reducing the

barriers of participation.

Policy is another key pillar of the SOYF initiative which can guide thinking about the makeup of the network. Barriers to participating can be lessened through legislation or regulation changes. With the aid of the municipality and the province some of the public infrastructure, lack of parking, lack of transportation, winter weather obstacles and cost barriers could potentially be addressed through policy and funding changes. In addition, lack of transportation could be lessened through policy, funding and formal partnerships between government and private and volunteer transportation services. Organizations that help create and guide policy development, outside of government organizations, could become key contributors to the SOYF initiative. For example, advocacy organizations such as non-profits representing individuals with chronic health diseases. Especially, organizations related to the most common chronic health conditions among older adults.

Health is another barrier to participation. Most older adults over the age of 65 suffer from one or more chronic conditions (Carstairs, 2010; CMA, 2013). The most common chronic conditions among older adults were arthritis, diabetes, high blood pressure, heart disease, and dementia (CIHI, 2011; Statistics Canada, 2014). Older adults with chronic conditions are more likely to miss taking part in social activities, volunteering in the community, and assisting family and friends (Meek et al., 2017). This finding concurs with the OAC study finds. Once an older adult reached a certain age or had a downgrade in health there were less likely to attend the OAC. To engage and provide falls prevention programming to older adults with chronic conditions home care companies, care coordinators, case managers and non-profit organizations may be most useful. SOYF could collaborate further to expand in-home falls prevention and hazard reduction as well as exercise. Especially, in rural areas where barriers to participating,

such as lack of transportation, is more prevalent.

Skills development is another pillar of SOYF. Non-Profit organizations and associations focused on specific chronic conditions could be further engaged. Their knowledge and potential engagement of older adults as well as assistance with policy change and skills development would be of value. The SOYF initiative network revealed three non-profit organizations all of which were reported as being important or within a representatives top ten most important contacts. Going forward, colleges, public and private, as well as universities could become valuable partners. By ensuring students studying exercise or health-related content have more opportunities to become certified in falls prevention programming and community assessments. Community organizations could also be helpful. For example, The Canadian Red Cross Society, St. John's Ambulance and the Heart & Stroke Foundation of Canada could be engaged. Course content covering falls among older adults for the general public taking first aid and CPR coursework, or for older adults themselves, could be developed or expanded in partnership with the SOYF initiative.

An assortment of other organizations could also be utilized. Northeastern Ontario, and the Greater Sudbury region, have organizations specific to cultures. For example, Great Sudbury has a substantial Indigenous population. There were no organizations representative of the Indigenous population mentioned by the interviewees. The SOYF initiative could make a point of engaging the local Indigenous health and friendship centres and Indigenous Elders. Greater Sudbury also contains clubs and groups related to Francophone, Ukrainian, Italian, Bangladesh, Indonesian and others cultures. Greater Sudbury is also home to the Sudbury Multicultural and Folk Arts Association which is connected to the various cultural groups and mandated to assist immigrants to the Sudbury area.

The SOYF initiative could benefit from growing the network to include a more diverse representation of health and social organizations. The five pillars of SOYF can help orient the network development. As well, taking into consideration the demographic heterogeneity in health status, activities, living arrangements as well as where and when falls occur. In combination, the pillars and angles from which to grow the network could help develop a SOYF network that caters to all older adults across the health continuum. Successful integration of health and social organizations results in improved access to services and programming. Improving access to services and programming requires collaboration.

6.2 Collaboration

Horizontal integration occurs when differing types of organizations that offer a similar level of care collaborate via informal partnerships (R. Axelsson & S. Axelsson, 2006). Informal collaborations were most prominent in the network which is consistent with organizational integration and public health initiatives that seek to integrate through horizontal means (R. Axelsson & S. Axelsson, 2006) (see Figure 6). Informal collaborations occurred between all types of organizations. The relationships among network members in inter-organizational collaborations exist for a variety of reasons such as information sharing, material and finance resource sharing, service sharing, or social support (Provan et al., 2007). In the SOYF network, informal collaborations occurred due to a shared goal or for information sharing purposes. Formal collaborations occurring in the SOYF network were primarily between government and health-related organizations (see Figure 7). Formal collaborations allowed for teams to work together formally and for the purposes of sharing services and staff.

The word network is synonymous with collaboration and examining networks can help

reveal the relationships among network members (Luke & Stamatakis, 2012). Research supports the importance of continued collaboration for implementing and sustaining health initiatives (Altpeter et al., 2014). Collaborations in health initiatives: generate better program delivery through service coordination, reduce service duplications, strengthen connections, provide opportunities to share strategies to create cultural change and tap into new resources (Altpeter et al., 2014; Valentijn et al., 2013). The complement of the collaborations in the network could be nurtured in a few ways to promote integration, sustainability and to achieve the five pillars of SOYF.

First, the purposes of the collaborations could be examined closer to ensure the types of collaborations (informal and formal) are in fact creating the positive effects known to occur as a result of collaboration. Second, traditional and non-traditional cross-sector alliances improve community-based health initiatives (Altpeter et al., 2014; Baker et al., 2007) The SOYF network could actively seek out collaborations with organizations that don't traditionally become involved in health initiatives. Third, consideration could be given to creating more formal collaborations specifically between health-related and community/social organizations. The type of collaborations occurring will change the frequency of contact among network members, thus the density of the SOYF network would be impacted.

6.3 Density

SNA findings measured using the frequency of contact among network members demonstrated that density of the SOYF network was low. Organizational integration requires prolific contact and communication, especially during implementation (R. Axelsson & S. Axelsson, 2006). While low density is typical of public health initiative networks, other studies

have reported higher percentages of density in much larger public health networks that have been established for a longer period of time than SOYF (CRHD, 2010; Corteville & Sun, 2009). Studies have not yet defined what the right amount of density is (Valente & Chou, 2007). Instead, density likely varies within a certain range for all health initiatives and varies within this range depending on the nature of the health initiative (Valente & Chou, 2007). The key is to determine if the density of any one network is correct for a particular initiative.

Density is a measure of cohesion (Palazzola et al., 2011). The denser, or more connected, a network is the more actors within a network are in contact and interact (Hanneman et al., 2005; Marsden, 1990). However, important to health networks is the capacity to bring together and integrate different types of knowledge (Blanchet & James, 2012). Integration requires the bringing together of knowledge from both health and social services and successful health initiatives function best when non-traditional partners are included (Altpeter et al., 2014; Heckman et al., 2013). The denser a network gets the more some actors with similar backgrounds are in contact which reduces the chances for the network actors to share different types of knowledge (Blanchet & James, 2012). Knowing the density of a network allows for discussion of how much density is beneficial (Provan et al., 2007).

The SOYF network density was low. For the SOYF network in particular, this may mean that not enough contact is taking place among all the organizations present in the network. Too high a density signals that too much contact may be occurring among actors from similar backgrounds. Not enough density may signal that not enough contact is occurring between actors that do not share similar backgrounds. In the SOYF network, the density sociogram appeared to show the presence of fragmentation (see Figure 3). Organization representatives on the left side were almost exclusively from the NE LHIN, the PHU, and academia. Organizations on the right

were predominantly primary care with some public health, long-term care, and community organizations. The two sides of the map were connected directly by two PHU representatives and two primary care representatives. Thus, the flow of information and different types of knowledge between the organizations on the left and those on the right could be constrained. Effort should be put to increasing contact among differing types of organizations, specifically health and social, to improve knowledge sharing and possibly reduce fragmentation.

Improving the contact among differing types of organizations will increase the density of the SOYF network. A denser network is not necessarily beneficial (Provan et al., 2007). Too much contact can inhibit the ability to function effectively and instead constrain productivity relative to time spent collaborating (Provan et al., 2007). Consideration could be given to the density differences within and between the left and right side of the SOYF network. Organizations on the left side appeared to be in contact more frequently while organizations on the right side appeared to be in contact less frequently. The left side contained a limited number of types of organizations compare to the right side.

Less density on the right side of the map may be suitable for the initiative since it contains more types of organizations. Improving density on the right side may reduce productivity due to time spent collaborating. Whereas, the left side may benefit from reducing frequency of contact, and therefore density, among each other in order to prioritize some time to spend collaborating with differing types of organizations. For example, the community/grassroots organizations already existing in the network and new community/grassroots organizations being brought into the network. Doing so, could help even out the density of the SOYF network by increasing contact levels among organizations that are different and reduce the possibility of fragmentation within the SOYF network as a whole.

Considering density tends to lessen as networks grow, the SOYF initiative should work to alter its contact behaviours to improve density (Corteville & Sun, 2009).

6.4 Centrality

Density is a measure of cohesion (Palazzola et al., 2011). In contrast, centrality is a measure of where the cohesion is focused, for example, around which actor/s or organization representative/s (Palazzola et al., 2011). Centrality is a positional feature arising out of the structure of the network that tells who the important actors are (Hanneman et al., 2005). The SOYF network had both a low density and a high betweenness centrality. Betweenness centrality is calculated by determining how many times an actor/node has the shortest path or connection to two other nodes (Hanneman et al., 2005). The SOYF network was found to be highly centralized. Four organization representatives were behaving as key communicators and gatekeepers of information (see Figure 4). They were all health-related organizations and one government organization. The actors with the highest betweenness centrality also reported having the highest levels of involvement in terms of amount of time dedicated to the implementation of SOYF. Gloor states, when centrality is reduced, and density increased, more individuals in a network are talking to each other and frequency of contact among them becomes more even across the network (as cited in Palazzola et al., 2011, p.5).

Having high betweenness centrality, and therefore limited actors controlling the spread of information, limits the ability to spread information evenly and efficiently throughout the network. The SOYF network could be changed by designating certain organization representatives, on top of the existing four representatives, to be key communicators of information to certain other organizations in the network. For example, designate/s from each of

the organization types, health-related, non-health, community/grassroots, government, and private sector, could be tasked with communicating to their respective organization types. Density measures of the SOYF network showed that frequency of contact was highest among similar types of organizations and between formal collaborators. Three of the four organization representatives with the highest betweenness centrality in the SOYF network were from health-related organizations. Therefore, cohesion was concentrated among similar types of organizations in the network and among those with formal agreements.

By increasing the number and types of organizations acting as gatekeepers, information could be spread further out into the network and the network could be decentralized. The implementation would be improved by extending the reach of the information further out into the community. Collaborations, as a result, could also be expanded and improved to integrate more social organizations into the network. The organization representatives with the highest betweenness centrality and the highest level of reported involvement could then potentially spend time on tasks not related to the spread of information. In addition, cohesion in the network could become less focused and more dispersed. Considering density tends to lessen as networks grow, actively reducing the betweenness centrality of the SOYF network could help ensure the density does not lower further as the network grows.

Degree centrality tells how connected actors are in a network (Hanneman,et al., 2005). When degree centrality was calculated, five organization representatives had the highest in-degree and out-degree centrality suggesting they are popular in the network, are seen as sources of information, and are influential with other network members (see Figure 5). They represented health-related organizations and the government. Three organization representatives had both the highest levels of in-degree centrality and out-degree centrality suggesting they have a dual role

of both sources and spreaders of information. They were all health-related organizations. The remaining two organization representatives had high levels of out-degree centrality, a health-related and a government organization. All five organizations were the busiest in terms of sharing information and being popular sources of information.

Each organization representative had a cluster of connections surrounding them made up of mostly similar organizations as has been found in previous studies (Yousefi-Nooraie, Dobbins, Brouwers, & Wakefield, 2012). The PHU organization representatives acted as intermediaries between the organization representatives with the highest in-degree and out-degree centralities and their associated clusters of connections. There were no organizations outside of health-related and government with centrality. This leaves a lot of opportunity to quickly expand the organizations affiliated with the network. For example, a community/grassroots organization could be nominated to be both a resource for information and an active engager of other older adult organizations. This would quickly increase the number of social organizations in the network since their connections are also likely to be made up of similar organizations.

Nominating specific organization representatives of the different types of organizations in the network and even within subsets of the organization types (ie. public health vs primary care) may be a beneficial strategy. Network research shows individuals tend to seek out information from handfuls of individuals within their sphere of contacts (Yousefi et al., 2012). An important point discussed during the interviews highlights the need for the sources and conveyors of information to be carefully selected when engaging older adults (Belza et al., 2004). Engaging and creating ownership for SOYF among older adults needs to be mindful of the spaces and individuals in which older adults trust and prefer to reach out to and receive information from,

such as social organizations and their peers (Peel & Warburton, 2009). The SOYF network could evolve so that some of the organizations in which older adults engage with their peers and access peer-led programming have more central roles. Knowing implementation is less about a final outcome as it is about ongoing or sustained accomplishment, SOYF should be re-examined in the future (May, 2013).

The SOYF network should be reassessed. A comparison of the implementation network with the measurement of the network at a point of time in the future would allow for an understanding of the growth of the network. Specifically, the network could be re-examined for the complement of organizations, health and social, in relation to the five pillars of SOYF and whether all older adults across the Queensland model health spectrum are being engaged. The collaborations could be measured for change and to ensure the positive aspects, such as access and quality of service, are occurring. The SOYF network could also be measured for integration, both horizontal and vertical, and to assess whether system-wide change has occurred. The system-wide change may be indicated, in part, by the creation of care pathways related to falls risk and health status among groups of older adults with similar circumstances. The care pathways would have certain groups of organizations or subnetworks associated with them within the full SOYF network. Organizations which would be pertinent to the characteristics of a sub-population of older adults, including their health status, and their activities for the delivery of services and programming related to falls prevention. Finally, the sustainability of SOYF and engagement of older adults in lead roles could be re-examined.

6.5 Limitations

The findings of the case study were limited due to the following factors. Snowball

sampling methods are an excellent way to find participants when you are not sure which organizations are in the network (Hanneman et al., 2005). However, snowball sampling techniques tend to find only the elites, or the most involved/popular, organizations within a network (Hanneman et al., 2005). Isolates, or important but unconnected or poorly connected network members, can be missed (Hanneman et al., 2005). The higher the response rate the better for network analysis, however, complete response rarely occurs (Corteville & Sun, 2009).

Another limitation of the sampling was the use of a free recall method. Some research has been dedicated to understanding whether free recall provides an accurate listing of network members (Marsden, 1990). Research has shown that participants are better at recalling social connections that are more recent, frequent, and stronger and tend to underreport the number of network connections they have during free recall (Marsden, 1990). Although, in general, cognitive psychology research suggests participants can accurately recall and report individuals/organizations likely because most individuals typically have a small set of close social relations to begin with (Marsden, 1990). Recall accuracy is improved when participants are first asked to list their stronger or more important ties first (Marsden, 1990). As a result, during the interview data collection for this study one of the questions was, "Are there any other individuals/organizations that help you with what you are doing for Stay on Your Feet that haven't been mentioned so far?". This question was aimed at collecting other network members that were not initially recalled after participants were first asked to list up to 10 organizations were important to their SOYF work.

An additional concern for collecting network data exists for accurately self-reporting on communication and contact of frequency between participants and the network members they recall. There is research to show, however, that participants are better at accurately responding to

questions that ask for their typical frequency of contact with network members rather than asking them to recall frequency of contact during highly specific time periods (Marsden, 1990). In this study, participants were asked how frequently they communicated with other network members and were not asked to report on a specific time period. When participants are not restricted to answering for specific periods of time, research comparing answers given by network members reporting on their respective recall of frequency of contact between each other shows their responses are concordant (Marsden, 1990). In addition, studies conducted by Schulman found agreements on communication between participants from 55% to 72% (as cited in Marsden, 1990). It was also found that agreement was weaker for participants that did not have strong connections and that participants tended to overstate reports of how often they communicated (Marsden, 1990).

6.6 Conclusion

As the Canadian population continues to age and the full onslaught of the Baby Boom wave of older adult's ages further the pressure for the health system to respond will intensify. The health system as a whole is under review and there are calls for innovation, integration, collaboration and system-wide change. Falls among older adults are one of the largest and most pressing problems the health system faces today. The falls crisis spills over into other major health system concerns such as the Alternate Level of Care crisis. Prevention of falls, through implementation of community-based initiatives, is perhaps one of the largest opportunities we have today to respond to the problem. Innovation to integrate health and social services through collaboration is called for to improve the lived experiences of older adults.

The five pillars of SOYF, awareness, hazard reduction, partnerships, skills development

and policy can assist in developing collaborative networks. Falls prevention initiatives like SOYF can be dynamic, flexible, community-based, and address the falls needs of older adults across the health spectrum. SOYF is an initiative that has proven itself in its ability to meet the challenge of prevention of falls among all older adults in multiple differing community environments. Perhaps the one thing undercutting and influencing the differences among the sub-populations of older adults is their health status. Health status, such as frailty, impacts many of the demographic characteristics of the sub-populations of older adults including living arrangements, physical activity, and care services received. The Queensland Model helps conceptualize the variances among older adults in the community, in-hospital, receiving in-home support or living in residential aged care dwellings.

With a full understanding of the heterogeneity of the older adult demographic in any particular area, SOYF can cater to the differences in the older adult population to reach out to them in the spaces and places in which they frequent. The type of activities older adults engage in, or not, can differ along many lines including age, health status and barriers such as income level. The type of activities engaged in also help shape when and where falls occur, such as walking outdoors. Ultimately, the differing health status and activity types engaged in by older adults can influence where and how we should reach out to older adults. Addressing falls in rural and northern areas poses further concerns. Networks of organizations collaborating to implement SOYF will likely have more non-traditional partners due to existence or non-existence of local organizations normally involved in community health programming. SOYF is flexible in how it is implemented and sustained and can achieve reduced falls rates in different network contexts.

Systems science and social network analysis tools can be used to develop a health initiative for falls prevention for all older adults across the health spectrum. A systems science

approach to measuring the development of networks allows for an initiative to evolve in tandem with the progression of older adults' life course trajectories. Environmental scans conducted to learn of organizations and community resources in conjunction with systems science approaches could assist in creating sub-networks in communities outside of Greater Sudbury. From a network perspective, falls prevention for older adults is most certainly an opportunity, not a problem, to reconfigure our health care system to meet the needs of today's older adults.

References

Abbasi, A., Wigand, R.T., & Hossain, L. (2014). Measuring social capital through network analysis and its influence on individual performance. Library & Information Science Research, 36, 66-73. http://dx.doi.org/10.1016/j.lisr.2013.08.001

Altpeter, M., Schneider, E.C., & Whitelaw, N. (2014). Examining strategies to build and sustain healthy aging programming collaboratives, *Health Education & Behaviour, 41,* 27S-33S. doi: 10.1177/1090198114537065

Axelsson, R., & Axelsson, S. B. (2006). Integration and collaboration in public health – a conceptual framework. *International Journal of Health Planning and Management, 21,* 75-88. doi:10.1002/hpm.826

Baker, D.I., Gottschalk, M., & Bianco, L.M. (2007). Step by step: integrating evidence-based fall-risk management into seniors centres. *The Gerontologist 47(4),* 548-554. doi: 10.1093/geront/47.4.548

Beach, C. M. (2008). Canada's Aging Workforce: Participation, productivity, and living standards. Retrieved from http://www.bankofcanada.ca/wpcontent/uploads/2010/09/beach.pdf

Belza, B., Walwick, J., Shiu-Thornton, S., Schwartz, S., Taylor, M., & LoGerfo, J. (2004). *Preventing Chronic Disease - Public Health Research, Practice and Policy. 1(4),*1-12. Retrieved from https://www.cdc.gov/pcd/issueS/2004/oct/pdf/04_0028.pdf

Blanchet, K., & James, P. (2012). How to do (or not to do)…a social network analysis in health systems research. *Health Policy and Planning, 27(5),* 438–446. Retrieved from https://academic.oup.com/heapol/article/27/5/438/752411

Borgatti, S.P., Everett, M.G., and Freeman, L.C. (2002). Ucinet 6 for Windows: Software for Social Network Analysis. Harvard, MA: Analytic Technologies.

Boyatzis, R.E. (1998). Transforming qualitative information. Sage: Cleveland.

Canadian Community Health Survey. (2003). *Report on seniors' falls in Canada. Public Health Agency of Canada - Division of Aging and Seniors*. Retrieved from http://publications.gc.ca/collections/Collection/HP25-1-2005E.pdf

Canadian Community Health Survey. (2015). *Social participation and the health and well-being of Canadian senior's.* Retrieved from https://www150.statcan.gc.ca/n1/pub/82-003-x/2012004/article/11720-eng.htm

Canadian Institute for Health Information. (2009). *Alternative level of care in Canada. Analysis in Brief.* Retrieved from https://secure.cihi.ca/free_products/ALC_AIB_FINAL.pdf

Canadian Institute for Health Information. (2011). *Seniors and the health care system: What is the impact of multiple chronic conditions? Analysis in Brief.* Retrieved from https://secure.cihi.ca/free_products/air-chronic_disease_aib_en.pdf

Canadian Institute for Health Information. (2011). *Health Care in Canada 2011 - A Focus on Senior's and Aging.* Retrieved from https://secure.cihi.ca/free_products/HCIC_2011_seniors_report_en.pdf

Canadian Institute for Health Information. (2012). *Senior's and Alternate Level of Care: Building on our knowledge.* Retrieved from https://secure.cihi.ca/free_products/ALC_AIB_EN.pdf

Canadian Institute for Health Research. (2012). *Living longer, living better. Canadian Institute of Health Research Institute of Aging Strategic Plan 2013 -2018.* Retrieved from http://www.cihr-irsc.gc.ca/e/documents/IA_Strategic_Plan_En_v5jul13.pdf

Canadian Medical Association (CMA). (2013). *Health and health care for an aging population: Policy summary for the Canadian Medical Association. Policy Summary of the Canadian Medical Association.* Retrieved from https://www.cma.ca/Assets/assets-library/document/en/advocacy/policy-research/CMA_Policy_Health_and_Health_Care_for_an_Aging-Population_PD14-03-e.pdf

Carstairs, S. (2010). Raising the bar: A roadmap for the future of palliative care in Canada. Ottawa: The Senate of Canada. The Senate of Canada. Retrieved from http://www.virtualhospice.ca/Assets/Raising%20the%20Bar%20June%202010_Senator%20Sharon%20Carstairs_20100608160433.pdf

Centre for Research in Human Development. (1999). The process for achieving full integration of services. Sudbury, ON: Lewko, J., Salhani, D. & Legault, M.

Chang, J.T., Morton, S.C., Rubenstein, L.Z., Mojica, W.A., Maglione, M., Suttorp, M.J., Roth, E.A., & Shekelle, P.G. (2004). Interventions for the prevention of falls in older adults: Systematic review and meta-analysis of randomized clinical trials. British Medical Journal, 328, 680-683. https://doi.org/10.1136/bmj.328.7441.680

Chen, A., Zagorski, B., Chan, V., Parsons, D., Vander Laan, R., & Colantonio, A. (2012). Acute care alternate-level-of-care days due to delayed discharge for traumatic and non-traumatic brain injuries. Healthcare Policy, *7(4),* 41-55.

Corteville,L. & Sun, M. (2009). An inter-organizational social network analysis of the Michigan Diabetes Outreach Networks: Measuring relationships in community networks. *Michigan Department of Community Health*. Retrieved from https://dpacmi.org/documents/SNA_Report_Final.pdf

Craig, C.L., Russell, S.J., Cameron, C., & Bauman, A. (2004). Twenty-year trends in physical activity among Canadian Adults. *Canadian Journal of Public Health, 59-63*. Retrieved from

https://www.ncbi.nlm.nih.gov/pubmed/14768744

Crandall, M., Duncan, T. Mallat, A., Greene, W., Violano, P., Christmas, A. B., & Barraco, R. (2016). Prevention of fall-related injuries in the elderly. *Journal of Trauma, 8(1),* 196-206. DOI: 10.1097/TA.0000000000001025

Faculty of Medicine. (2009). Clinical Frailty Scale Diagram. Faculty of Medicine - Geriatric Medicine Research. Dalhousie University, NS, Canada. Retrieved from Dalhousie University website http://geriatricresearch.medicine.dal.ca/clinical_frailty_scale.htm

Fixsen, D.L., Naoom, S.F., Blase, K.A., Friedman, R.M. & Wallace, F. (2005). Implementation research: A synthesis of the literature. Retrieved from https://fpg.unc.edu/node/4445

Ganz, D.A., Alkema, G.E. & Wu, S. (2013). It takes a village to prevent falls: reconceptualizing fall prevention and management for older adults. Injury Prevention, 14, 266-271. Retrieved from http://dx.doi.org/10.1136/ip.2008.018549

Gatrell, A.C. (2005). Complexity theory and geographies of health: a critical assessment. Social Science & Medicine, 60, 2661-2671. Retrieved from http://dx.doi.org/10.1016/j.socscimed.2004.11.002

Hahn, A., Van Beurden, E., Kempton, A., Sladden, T., & Garner, E. (1996). Meeting the challenge of falls prevention at the population level: A community based intervention with older people in Australia. *Health Promotion International, 11(3),* 203-211. Retrieved from https://doi.org/10.1093/heapro/11.3.203

Haldimand-Norfolk Health Unit, (2007). *Rural Health: A qualitative research approach to understanding best practices for rural health service delivery in a public health setting.* Retrieved from https://hnhu.org/reports-studies/rural-health/

Hanneman, Robert A,. & Mark Riddle. (2005). Introduction to social network methods. Riverside, CA: University of California, Riverside. Retrieved from http://faculty.ucr.edu/~hanneman/nettext/

Heckathorn, D.D. (2011). Snowball sampling versus respondent-driven sampling. Sociology Methodology, *41(1),* 355-366. Retrieved from https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3250988/

Heckman, G.A., Hillier, L., Manderson, B., McKinnon-Wilson, J., Sanit, S.M., & Stolee, P. (2013). Developing an integrated system of care for frail seniors. *Healthcare Management Forum, 26,* 200-208. Retrieved from http://journals.sagepub.com/doi/abs/10.1016/j.hcmf.2013.09.003

Hicks, P. (2003). The policy implications of aging: Transformation of national and international thinking. H*orizons, 6(2),* 12-16.

Kempton, A., Van Beurden, E., Sladden, T., Garner, E., & Beard, J. (2000). Older people stay on their feet: Final results of a community-based falls prevention program. *Health Promotion International, 15(1),* 27-33. Retrieved from https://doi.org/10.1093/heapro/15.1.27

Kelsey. J.L., Procter-Gray, E., Hannan, M.T., & Li, W. (2012). Heterogeneity of falls among older adults: Implications for public health prevention. *American Journal of Public Health, 102(11),* 2149-2156. Retrieved from https://www.ncbi.nlm.nih.gov/pubmed/22994167

Kothari, A., Hamel, N., MacDonald, J., Meyer, M., Cohen, B., & Bonnenfant, D. (2014). Exploring community collaborations: Social network analysis as a reflective tool for public health. *Systematic Practice and Action Research, 27,* 123-137. DOI:10.1007/s11213-012-9271-7

Labbe, A.L., Lewko, J., Volpe, R., Salmoni, A., & Colantonio, A. (2015). Preliminary discussions with OAC's and Senior Clubs in the North East. Centre for Research in Human Development. Sudbury, ON.

Li, W., Keegan, T.H.M., Sternfeld, B., Sidney, S. & Quesenberry, C.P. Jr. (2006). Outdoor falls among middle-aged and older adults: A neglected public health problem. *American Journal of Public Health, 96(7),* 1192-1200. DOI: 10.2105/AJPH.2005.083055

Luke, D.A., & Harris, J.K. (2012). Network analysis in public health: History, methods, and applications. *Annual Review of Public Health, 28,* 69-93. DOI: 10.1146/annurev.publhealth.28.021406.144132

Luke, D.A., & Stamatakis, K.A. (2012). Systems science methods in public health: Dynamics, networks, and agents. *Annual Review of Public Health, 33,* 357-376. DOI: 10.1146/annurev-publhealth-031210-101222

MacAdam, M. (2011). Progress toward integrating care for seniors in Canada. *International Journal of Integrated Care, 11,* 1-9.

MacLellan-Wright, M.F., Anderson, D., Barber, S., Smith, N., Cantin, B., Felix, R., & Raine, K. (2007). The development of measures of community capacity for community-based funding programs in Canada. *Health Promotion International, 22(4),* 299-306. DOI: https://doi.org/10.1093/heapro/dam024

McClure, R.J., Hughes. K., Ren. C., McKenzie, K., Dietrich, U., Vardon, P., Davis, E., & Newman, B. (2010). The population approach to falls injury prevention in older people: findings of a two community trial. *BioMed Central Public Health, 10(79),* 1-9. Retrieved from https://bmcpublichealth.biomedcentral.com/articles/10.1186/1471-2458-10-79

McQueen, D.V. (2000). Perspectives on health promotion: Theory, evidence, practice and the emergence of complexity. *Health Promotion International.* Retrieved from https://academic.oup.com/heapro/article/15/2/95/585358

Maglio, P.P., Sepulveda, M.J., & Mabry, P.L. (2014). Mainstreaming modelling and simulation to accelerate public health innovation. *American Journal of Public Health, 104(7),* 1181-1186. DOI: 10.2105/AJPH.2014.301873

Marsden, P.V. (1990). Network Data and Measurement. *Annual Review of Sociology, 16,* 435-463. DOI: 10.1146/annurev.so.16.080190.002251

May, C. (2013). Towards a general theory of implementation. Implementation Science, 8 (18), 1-14. DOI: 10.1186/1748-5908-8-18

Meek, K.P., Bergeron, C.D., Towne Jr., S.D., Ahn, S.N., Ory, M.G., & Smith, M.L. (2017). Restricted Social Engagement among Adults Living with Chronic Conditions. International *Journal of Environmental Research and Public Health, 15(1),* 158. Retrieved from https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5800257/pdf/ijerph-15-00158.pdf

Ministerial Advisory Council on Rural Health (MACRH). (2002). *Rural health in rural hands: Strategic directions for rural, remote, northern, and Aboriginal communities*. Retrieved from Government of Canada website http://publications.gc.ca/collections/Collection/H39-657-2002E.pdf

National Expert Commission. (2011). *Canada: An aging population that is living longer*. Retrieved from Canadian Nursing Association website https://www.cna-aiic.ca/~/media/cna/files/en/fact_sheet_03_e.pdf?la=en

North East Local Health Integration Network. (2008). *North East Local Health Integration Network Demographic and Health Profile.* Retrieved from NE LHIN website http://www.nelhin.on.ca/newsandevents/internalpublications.aspx

North East Local Health Integration Network. (2012). *Falls Prevention - Helping Senior's Stay Out of the Hospital*. Retrieved from NE LHIN website http://www.nelhin.on.ca/Search.aspx?search=falls

North East Local Health Integration Network. (2014). *North East LHIN Population Health Profile, Winter 2014.* Retrieved from NE LHIN website http://www.nelhin.on.ca/Search.aspx?search=population%20health%20profile

Noya, A., Clarence, E., & Craig, G. (2009). Report for the Organization for Economic Cooperation and Development. *Community capacity building: Creating a better future together.* Retrieved from http://www.oecd.org/publications/community-capacity- building-9789264073302-en.htm

Nowak, A., & Hubbard, R.E. (2009). Falls and frailty: Lessons from complex systems. *Journal of the Royal Society of Medicine. 10,* 98-102. Retrieved from http://journals.sagepub.com/doi/abs/10.1258/jrsm.2009.080274

Older Adult Centres' Association of Ontario (2008). *Building bridges to tomorrow: Profile of*

older adult centres in Ontario. Retrieved from OACAO website http://www.oacao.org/trillium_grant.html

Older Adult Centres' Association of Ontario (2010). *Building bridges to tomorrow: A user profile of older adults centres in Ontario.* Retrieved from OACAO website http://www.oacao.org/trillium_grant.html

Ontario Healthy Communities Coalition (n.d.). *Community Capacity Building*. Retrieved from OHCC website http://www.ohcc-ccso.ca/en/community-capacity-building-0

Ontario Neurotrauma Foundation. (2006). Evaluation of Stay On Your Feet: A seniors falls demonstration project. Retrieved from ONF website http://onf.org/system/attachments/123/original/SOYF_Evaluation.pdf

Ontario Seniors Secretariat. (2013). Ontario's Action Plan for Seniors: Independence, activity, and good health. Retrieved from OACAO website http://www.oacao.org/images/ontarioseniorsactionplan-en.pdf

Ontario Trillium Foundation. (2011). Ontario's aging population: Challenges & opportunities. Retrieved from Rural Ontario Institute website http://www.ruralontarioinstitute.ca/file.aspx?id=c31f2ff2-cb12-4d47-8cce-165196c8734a

Palazzola, M., Grippa,F., Booth, A., Rechner, S., Bucuvalas, J., & Gloor, P. (2011). Measuring Social Network Structure of Clinical Teams Caring for Patients with Complex Conditions. *Procedia Social and Behavioural Sciences, 26,* 17-29. Retrieved from https://core.ac.uk/download/pdf/82422233.pdf

Peel, N.M., & Warburton, J. (2009). Using senior volunteers as peer educators: What is the evidence of effectiveness in falls prevention. *Australasian Journal of Ageing, 28(1),* 7-11. Retrieved from https://onlinelibrary.wiley.com/doi/full/10.1111/j.1741-6612.2008.00320.x

Philpott, J. (2013). Remarks from the Honorable Jane Philpott, Minister of Health, to the Canadian Medical Association Annual General Meeting. Vancouver, BC. Retrieved from https://www.canada.ca/en/health-canada/news/2016/08/remarks-from-the-honourable-jane-philpott-minister-of-health-to-the-canadian-medical-association-annual-general-meeting.html

Plesk, P.E., & Greenhalgh, T. (2001). Complexity science: The challenge of complexity in health care. *Education and Debate, 323,* 625-628.

Provan, K.G., Veazie, M.A., Staten, L.K., & Teufel-Shone, N. (2005). The use of network analysis to strengthen community partnerships. *Public Administration Review, 65(5),* 603-613. DOI: 10.1111/j.1540-6210.2005.00487.x

Provan, K.G., Fish, A., & Sydow, J. (2007). Inter-organizational networks at the network level: A review of the empirical literature on whole networks. *Journal of Management, 33(3),* 479-516. Retrieved from http://journals.sagepub.com/doi/abs/10.1177/0149206307302554

Public Health Agency of Canada. (2014). *Senior's falls in Canada: Second report.* Retrieved from PHAC website http://www.phac-aspc.gc.ca/seniors-aines/publications/public/injury-blessure/seniors_falls-chutes_aines/assets/pdf/seniors_falls-chutes_aines-eng.pdf

Public Health Agency of Canada. (2011). *Health care in Canada 2011: A focus on seniors and aging.* Retrieved from Canadian Institute for Health Information website https://secure.cihi.ca/free_products/HCIC_2011_seniors_report_en.pdf

Regional Business Centre. (2013). *Greater Sudbury Statistics*. Retrieved from Regional Business Centre website http://www.regionalbusiness.ca/images/pdfs/Statistics_Guide.pdf

Regional Geriatric Program of Eastern Ontario, 2015). *Falls Prevention Program.* Retrieved from RGPEO website http://www.rgpeo.com/en/health-care-practitioners/falls-prevention-program.aspx

Rowley, T.J., Greve, H. R., Rao, H., Baum, J.A. C., & Shipilov, A.C. (2005). Time to break up: Social and instrumental antecedents of firm exits from exchange cliques. *Academy of Management Journal, 48(3),* 499-520. doi: 10.5465/AMJ.2005.17407914

Schonnop, R., Yang. Y., Feldman, F., Robinson, E., Loughin, M., & Robinovitch, S. N. (2013). Prevalence of and factors associated with head impact during falls in older adults in long-term care. *Canadian Medical Association Journal, 185,* 803–810. Retrieved from https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3832581/

Scott, V., Wagar, L., & Elliot, S. (2010). Falls & related injuries among older Canadians: Fall related hospitalizations & prevention initiatives. *Public Health Agency of Canada - Division of Aging and Seniors.* Retrieved from http://www.hiphealth.ca/mediaresearch_cemfia_phac_epi_and_inventor_20100610.pdf

Sherrington, C., Whitney, J.C., Lord, S.R., Herbert, R.D., Cumming, R.G., & Close, J.C.T. (2008). Effective exercise for the Prevention of Falls: A systematic review and meta-analysis. *Journal of American Geriatrics Society, 56(12),* 2234-2243. Retrieved from http://www.laterlifetraining.co.uk/wp-content/uploads/2011/12/Sherrington_Ex_Int_Review_2008_JAGS.pdf

Sinha, S.K. (2012). *Living longer, living well.* Report submitted to Ministry of Health and Long-Term Care. Retrieved from Ontario Government website http://www.health.gov.on.ca/en/common/ministry/publications/reports/seniors_strategy/docs/seniors_strategy_report.pdf

Statistics Canada (2004). *The Sandwich Generation. Perspectives on Labour and Income.* Retrieved from Statistics Canada website http://www.statcan.gc.ca/pub/75-001-x/10904/7033-eng.htm

Statistics Canada. (2008). *Canada's aging population.* Retrieved from Statistics Canada website

http://publications.gc.ca/collections/Collection/H39-608-2002E.pdf

Statistics Canada. (2010*). Rural and small town Canada: An analysis bulletin.* Retrieved from Statistics Canada website http://www.statcan.gc.ca/pub/21-006-x/21-006-x2008005-eng.pdf

Statistics Canada. (2011). *Age and sex, 2011 census.* Retrieved from Statistics Canada website https://www12.statcan.gc.ca/census-recensement/2011/as-sa/98-311-x/98-311-x2011001-eng.cf

Statistics Canada. (2012). *Population projections for Canada, provinces and territories: Highlights.* Retrieved from Statistics Canada website http://www.statcan.gc.ca/pub/91-520-x/2010001/aftertoc-aprestdm1-eng.htm

Statistics Canada. (2014). *Prevalence of health-promoting factors by age group, household population aged 45 or over, Canada, 2009.* Retrieved from Statistics Canada website http://www.statcan.gc.ca/pub/82-003-x/2010003/article/11289/tbl/tbl3-eng.htm

Statistics Canada. (2014). *The Chief Public Health Officer's Report on the State of Public Health in Canada: Public Health in the Future.* Retrieved from Public Health Agency of Canada website http://www.phac-aspc.gc.ca/cphorsphc-respcacsp/2014/chang-eng.php

Statistics Canada. (2015). *Canada's Population Estimates: Age and Sex July 1, 2015.* Retrieved from Statistics Canada website http://www.statcan.gc.ca/daily-quotidien/150929/dq150929b-eng.htm

Sutherland, J.M., & Crump, R.T. (2013). Alternative level of care: Canada's hospital beds, the evidence and options. Healthcare Policy, *9(1),* 26-34. Retrieved from http://pubmedcentralcanada.ca/pmcc/articles/PMC3999549/

Valente, T.W., & Chou, C.P. (2007). Community coalitions as a system: Effects of network change on adoption of evidence-based substance abuse prevention. American Journal of Public Health, 97(5), 880-886. Retrieved from https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1854884/

Valentijn, P.P., Schepman, S.M., Opheji, W., & Bruijnzeels. (2013). Understanding integrated care: A comprehensive framework based on the integrative functions of primary care. *International Journal of Integrated Care, 13,* 1-13. Retrieved from http://doi.org/10.5334/ijic.886

Volpe, R., Lewko, J., Rae, C., Bell, R., Tremblay, C., & Davidson, C. (2010). Timiskaming Best Start Appreciative Inquiry - Final Report. University of Toronto, Toronto.

Walker, D. (2011). Caring for our aging population and addressing alternate level of care. *Report Submitted to the Ministry of Health and Long-Term Care.* Retrieved from http://www.ontla.on.ca/library/repository/mon/25009/312292.pdf

Yousefi-Nooraie, R., Dobbins, M., Brouwers, M., & Wakefiled, P. (2012). Information seeking for making evidence-informed decisions: A social network analysis on the staff of a public health department in Canada. *BMC Health Services Research, 16(12),* 118. Retrieved from https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3496590/pdf/1472-6963-12-118.pdf

Appendix A: Queensland Model

Appendix B: SNA Survey

Social Network Data

Column 1	Column 2	Column 3	Column 4	Column 5	Column 6	Column 7	Column 8
In this column, please list the 10 people important to your work function as it relates to SOYF **(include their job title and first name followed by last name).** **Name/ Organization**	For each person listed in Column 1, in this column please indicate the organizational proximity to you by choosing one of the following responses: **(in this column also include the name of their organization if different from your own).** A) same department B) same organization C) affiliated organization D) outside organization	For each person that you listed in **Column 1**, please indicate the way that you communicate with them about SOYF by choosing one of the following responses (when multiple responses exist please indicate the *primary* mode of communication from amongst your responses): A) email B) telephone C) conference calls D) group meetings E) individual face-to-face meetings F) other (please describe)	For each person that you listed in **Column 1,** in this column please indicate how often you communicate with them about SOYF by choosing one of the following responses: A) daily B) weekly C) biweekly D) monthly E) less than monthly	For each person that you listed in **Column 1,** in this column please indicate how much you agree with the statement "I would be more effective in my work related to SOYF if I were able to communicate with this person more" by choosing one of the following responses: A) Strongly disagree B) disagree C) sometimes disagree and sometimes agree D) agree E) strongly agree	For each person listed in Column 1, in this column please indicate the length of time you have known them by choosing one of the following responses: A) < 6 months B) 6 months to 1 year C) 1 to 5 years D) 5 to 10 years E) > 10 years	For each person that you listed in **Column 1,** in this column please indicate the level of understanding you have about their position in SOYF by choosing one of the following responses: A) little understanding about what this person does B) some understanding about what this person does C) understand exactly what this person does	For each person listed in Column 1, please indicate the level of collaboration by choosing one of the following responses: A) do not work together B) share information only C) work together informally to achieve common goals D) work together as a formal team with specific responsibilities e.g. MOU E) work together as a formal team e.g. share staff and resources
1)List (Name/ Organization)							
2) etc up to 10							

Appendix C: Interview Questions

1. Can you tell me what your role/position/title is and when you began working on Stay on Your Feet?

2. Please describe for me how you fit into the Stay on Your Feet initiative

3. One of the reasons Stay on Your Feet has been successful is because different people can be involved on different levels. What would you check off about your level of involvement in Stay on Your Feet over last 6 months?

[ ] 1-2 times [ ] 3-5 times [X] 6+ or more

4. Describe the population in the community that your organization reaches out to for your Stay On Your Feet work?

5. Can you please tell me about how your organization has helped to support Stay on Your Feet over the past 12 months?

Home hazards? Raising awareness of falls? Anything specific for skills development for falls? Development of partnerships?

6. Are there any other individuals/organizations that help you with what you are doing for Stay on Your Feet that haven't been mentioned so far?

7. What is the single most important thing the SOYF initiative can do in the next 2 years to improve the implementation of Stay On Your Feet?